Serving the CoCo Community for

The RAINBOW

11 YEARS

THE COLOR COMPUTER MONTHLY MAGAZINE

August 1991 Vol. XI No. 1

Canada $4.95 U.S. $3.95

Palette-able CoCo

Draw with Text & Graphics

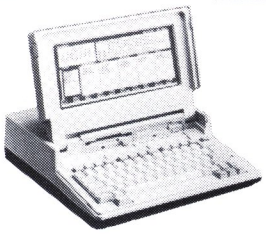
Brush with Alien Forces in Megatank

Paint a Better Picture for OS-9 Interrupts

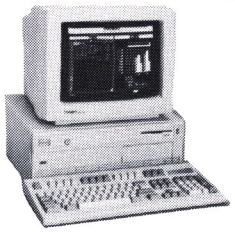
Design Powerful Assembly Macros

From Computer Plus to YOU . . .

PLUS after PLUS after PLUS

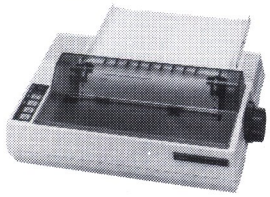


Tandy 1100 FD $689
Tandy 102 32K $439
Tandy WP-2 $279

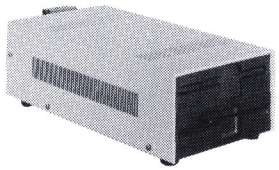


Tandy 2500 XL/2 $1099
Tandy 4020 SX $1499

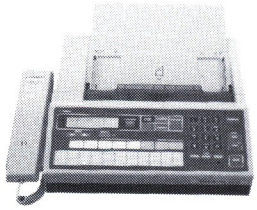
Tandy 1000 RL $439*
Tandy 1000 TL/3 $799



DMP-134 $269



Color Computer Disk Drive
Drive 0 $239 Drive 1 $149



TandyFax 1010 $619

BIG SAVINGS ON A FULL COMPLEMENT OF RADIO SHACK COMPUTER PRODUCTS

COMPUTERS	
Tandy 1000 RLX HD 1 Drive 1 Meg RAM	999.00
Tandy 1500 HD 1 Drive 640K	1179.00 *
Tandy 2810 HD 1 Drive 1 Meg RAM	2049.00
Tandy 1000 RL HD-1 Drive-512K	769.00 *
Tandy 1100 FD 1 Drive 640K	689.00
PRINTERS	
Tandy DMP-107 120 CPS	159.00 *
Tandy DMP-302 270 CPS	469.00
Tandy DMP-202 180 CPS	299.00
Tandy DMP-442 300 CPS	539.00
Tandy LP-950 Laser Printer	1299.00
Tandy DMP-240 192 CPS 8 color	415.00
Panasonic KXP 1180 192 CPS	189.00 *
Panasonic KXP 1123 24 Wirehead	259.00 *
Panasonic KXP 1124 192 CPS	299.00 *
Okidata 320 300 CPS	369.00
Okidata 380 180 CPS 24 Wire HD	259.00
OKI Laser 400 4PPM	699.00 *

MODEMS	
Tandy DCM-6	52.00
Tandy DCM-7	85.00
Cardinal 1200 Baud External	99.00
Cardinal 2400 Baud	129.00

COLOR COMPUTER MISC.	
Tandy Drive Controller	89.00 *
Extended Basic Rom Kit (28 pin)	14.95
64K Ram Upgrade Kit (2 or 8 chip)	39.00
Tandy Deluxe Keyboard Kit	24.95
HI-RES Joystick Interface	8.95
Color Computer Deluxe Mouse	44.00
Multi Pak Pal Chip for COCO 3	14.95
COCO 3 Service Manual	29.95
Serial to Parallel Converter	59.95
Tandy Deluxe Joystick	19.95
Magnavox 8135 RGB Monitor	299.00
Magnavox Green or Amber Monitor	99.00
CoCo 3 Gime Chip	29.95
Tandy Pistol Grip Joystick	26.95
PBJ OK COCO 3 Upgrade Board	29.95
PBJ 512K COCO 3 Upgrade	89.00
Tandy OK COCO 3 Upgrade Board	39.95
Tandy 512K COCO 3 Upgrade	99.00 *

COLOR COMPUTER SOFTWARE	TAPE	DISK
The Wild West (COCO 3)		25.95
Worlds of Flight	34.95	34.95
Mustang P-51 Flight Simul.	34.95	34.95
Flight 16 Flight Simul.	34.95	34.95

Tandy Educatioal Software		2.00
Spinnaker Software		2.00
Max 10 by Colorware		79.95
AutoTerm by PXE Computing	29.95	39.95
TW-80 by Spectrum (COCO 3)		39.95
TeleWriter 64	49.95	59.95
TeleWriter 128		79.95
Elite Word 80		79.95
Elite Calc 3.0		69.95
CoCo 3 512K Super Ram Disk		19.95
Home Publishing by Tandy (CoCo 3)		35.95
Sub Battle Sim. by Epyx (CoCo 3)		26.95
Thexder by Sierra (CoCo 3)		22.45
Kings Quest III by Sierra (CoCo 3)		31.45
Flight Sim. II by SubLogic (CoCo 3)		31.45
OS-9 Level II by Tandy		71.95
OS-9 Development System		89.95
Multi-View by Tandy		44.95
VIP Writer (disk only)		69.95
VIP Integrated Library (disk)		149.95

Prices are subject to change without notice. Please call for shipping charges. Prices in our retail store may be higher. Send for complete catalog.

***Sale prices through 9-15-91**

CALL TOLL FREE
1-800-343-8124

- *LOWEST POSSIBLE PRICES*
- *BEST POSSIBLE WARRANTY*
- *KNOWLEDGEABLE SALES STAFF*
- *TIMELY DELIVERY*
- *SHOPPING CONVENIENCE*

VISA AMERICAN EXPRESS MasterCard

computer plus

P.O. Box 1094
480 King Street
Littleton, MA 01460

SINCE 1973

IN MASSACHUSETTS CALL (508) 486-3193

Tandy is a registered trademark of Tandy Corp.

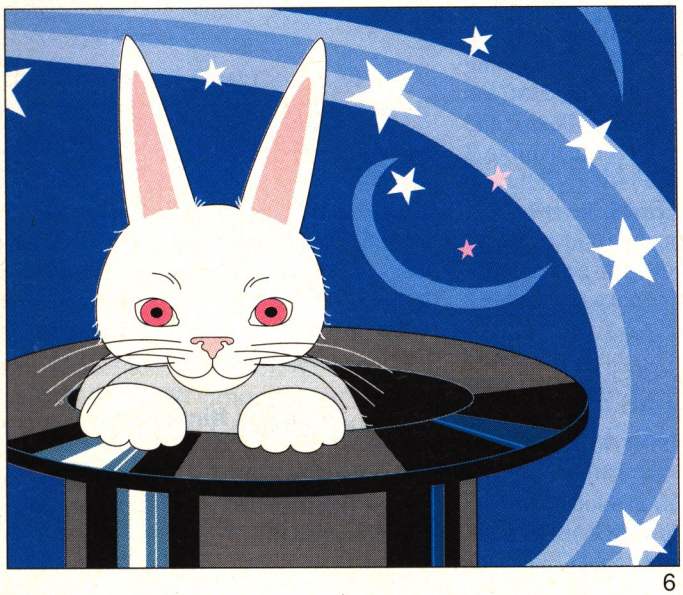
Serving the CoCo Community for

RAINBOW

Table of Contents

August 1991
Vol. XI No. 1

Features



6

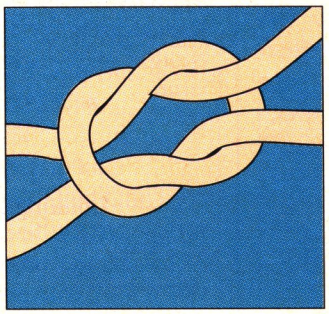
6
Font Magician
Geoff Friesen
Add the IBM extended character set to the CoCo 3's graphics

28
Interrupted Again
Robert Gault
A software technique that eliminates the cartridge-interrupt problem

34
Megatank
Marshall Weisenburger
A battle of wits against alien forces

41
Assembly Line
William P. Nee
Macro-may

56
Ultralace: The Epson Version
H. Allen Curtis
Part IV brings the Epson/IBM-compatible version of the main Ultralace program



41

The cassette tape/disk symbols beside features and columns indicate that the program listings with those articles are on this month's RAINBOW ON TAPE and RAINBOW ON DISK. Those with only the disk symbol are not available on RAINBOW ON TAPE. For details, check the RAINBOW ON TAPE and RAINBOW ON DISK ad on page 51.

Columns

16
BreakPoint
Greg Law
The system calls

30
CoCo Consultations
Marty Goodman
Serial connections

46
Delphi Bureau
Eddie Kuns
Literally speaking

38
OS-9 Hotline
Rainbow Staff
Down to business

10
Print#-2
Lonnie Falk
Editor's notes

Novices Niche

22
Text & Graphics
Keiran Kenny

23
Palette Control
Chuck Katsekes

23
Text-Screen Dump
Joel Hegberg

24
Tax Tables
Charles Gibson

Product Reviews

Baseball Card Catalog/*The Millsoft Company* ____ **50**
BASIC Windows 2.0/*KB Enterprises* ____ **55**
D10 Fonts/*Coless Computer Design* ____ **50**
Envelope Writer/*The Trading Post* ____ **53**
GrafExpress/*Softronics Vanguard* ____ **52**
M10 Clip Art/*Coless Computer Design* ____ **52**

Departments

Advertisers Index ___ 65
Back Issue Info ____ 32
Corrections ____ 21
Intercom ____ 62
Letters to Rainbow ___ 4
Received & Certified 49
Reviewer Info ____ 42
Submitting Material ___ 61
Subscription Information 7

THE RAINBOW is published every month of the year by FALSOFT, Inc., The Falsoft Building, 9509 U.S. Highway 42, P.O. Box 385, Prospect, KY 40059, phone (502) 228-4492. **THE RAINBOW**, **RAINBOWfest** and **THE RAINBOW** and **RAINBOWfest** logotypes are registered trademarks of FALSOFT, Inc. ● Second class postage paid Prospect, KY and additional offices. USPS N. 705-050 (ISSN No. 0746-4797). POSTMASTER: Send address changes to **THE RAINBOW**, P.O. Box 385, Prospect, KY 40059. Authorized as second class postage paid from Hamilton, Ontario by Canada Post, Ottawa, Ontario, Canada. ● Entire contents copyright © by FALSOFT, Inc., 1991. **THE RAINBOW** is intended for the private use and pleasure of its subscribers and purchasers and reproduction by any means is prohibited. Use of information herein is for the single end use of purchasers and any other use is expressly prohibited. All programs herein are distributed in an "as is" basis, without warranty of any kind whatsoever. ● Tandy, Color BASIC, Extended Color BASIC and Program Pak are registered ® trademarks of the Tandy Corp. ● Subscriptions to **THE RAINBOW** are $31 per year in the United States. Canadian rates are U.S. $38. Surface mail to other countries is U.S. $68, air mail U.S. $103. All subscriptions begin with next available issue. ● Limited back issues are available. Please see notice for issues that are in print and their costs. Payment accepted by VISA, MasterCard, American Express, cash, check or money order in U.S. currency only. Full refund after mailing of one issue. A refund of 10/12ths the subscription amount after two issues are mailed. No refund after mailing of three or more magazines.

THE RAINBOW

Editor and Publisher
Lawrence C. Falk

Managing Editor Cray Augsburg
Associate Editor Sue Fomby
Copy Editor Rob Moore
Submissions/Reviews Editor Tony Olive
Technical Editor Greg Law
Technical Assistants Ed Ellers, Gregory Shultz
Editorial Assistant Julie Hutchinson
Contributing Editors
William Barden, Jr.
Tony DiStefano, Martin Goodman, M.D.
Eddie Kuns
Art Director Heidi Nelson
Designers Sharon Adams, Teri Kays, Debbee Diamond
Consulting Editors Judi Hutchinson, Laurie D. Falk
Typesetter Debbee Diamond

Falsoft, Inc.

President Lawrence C. Falk
General Manager Peggy Lowry Daniels
Asst. General Mgr. for Finance Donna Shuck
Admin. Asst. to the Publisher Kim Thompson
Editorial Director John Crawley
Director of Creative Services O'Neil Arnold
Chief Bookkeeper Diane Moore
Dealer Accounts Judy Quashnock
Asst. Gen. Manager For Administration Sandy Apple
Corporate Business Technical Director Calvin Shields
Customer Service Manager Beverly Bearden
Customer Service Representative Patricia Eaton
Chief of Printing Services Melba Smith
Chief of Prepress and Dispatch Tim Whelan
Business Assistant Wendy Falk Barsky
Chief of Building Security and Maintenance Lawrence Johnson
Asst. General Manager for Advertising, Development and Production Ira Barsky
Advertising Representatives Belinda Kirby, Kim Lewis
Advertising Assistant Carolyn Fenwick
(502)228-4492

For RAINBOW Advertising and Marketing Office Information, see Page 65

Letters to the RAINBOW

A Great Deal

Editor:

I am new to the CoCo Community. I have a secondhand 64K CoCo I received in exchange for an Atari game system. I also have a CoCo 3, a disk drive and a CM-8 Monitor. I am 28 years old and have no formal computer training. It is fun teaching myself basic computer skills. The CoCo is a good computer from which to learn, and THE RAINBOW shows that it is much more. I like the insightful tips on how to fully use the CoCo's potential. I also believe THE RAINBOW is more informative than my local Radio Shack. THE RAINBOW is a great publication, and I am looking forward to every issue.

Andrew VanOstrand
Rochester, New York

Looking for FORTRAN

Editor:

I want more information about using the CoCo 3 to write programs in FORTRAN-77. William Barden's article, "Computer Knowledge in Any Language," states that FORTRAN for the CoCo is not available. But Herschel B. Eliker asserts that FORTRAN-77, from Microware, has been available for some time (November 1989, Page 6).

I would like to know more about this Microware FORTRAN product and how to obtain it. I own two CoCo 3s, each is equipped with 512K and two FD-502 disk drives. I also have the OS-9 Level II operating system for these computers.

I have research interests in computational chemistry and want to develop some scientific programs for the CoCo 3 using FORTRAN-77.

Grady Carney
32 Central Avenue
Westbury, NY 11590

To be sure, we called Microware (again) and were informed that they no longer support OS-9 for the 6809 — they no longer sell FORTRAN for the CoCo. As you already have OS-9 Level II, consider using BASIC09 instead of FORTRAN. BASIC09 combines a strong blend of FORTRAN- and Pascal-type structures with the ease of BASIC.

General Assembly

Editor:

I just bought a CoCo 3 and I would like to learn assembly language. Do you know if a cassette-based assembler (something like *EDTASM+*) still exists? I prefer a cassette program because I don't plan to buy a disk drive in the near future. I bought my CoCo 3 only to have a machine on which to practice 6809 assembly language.

Robert Dagenais
124 Pacifique
Laval, PQ H7N 3Y1
Canada

Unless you work with 6809-based microcontrollers, it seems to us the CoCo is about the only place to use *6809 assembly language once you learn it. Oh well, to each his own. Contact Tandy's Express Order system at (800) 321-3133 to obtain the cassette-based* EDTASM. *Better hurry though — the last time we checked, EOS had limited quantities available.*

Loading Binary Files

Editor:

I have *Color Disk EDTASM+*. How do I load a file that has a `.BIN` extension (for example, `HAZARD.BIN`)?

Aaron Sebold
Hillsboro, Montana

To load a binary (`.BIN`) file into Disk BASIC for execution, enter `LOADM` *followed by the full filename in quotes. To load a binary file into* EDTASM+, *get into* ZBUG *by pressing Z. Then load the file using the* `LD` *command as described on Page 78 of the* Color Disk EDTASM+ *manual.*

RCIS Network Info

Editor:

I want to share some information about the RCIS Network. This network is composed of OS-9-based CoCo 3 systems only and links California to Florida, New Jersey to Canada, and a lot in between. The RCIS Network is almost like a Fidonet system, only better. Not only does the RCIS system network E-mail and messages on a daily basis, it networks BBS lists and download-file lists from all the systems, making it possible for you to "request" a file from another remote system and have it sent to your home system. The RCIS Network has been in operation for over two years (I am the SysOp of the Unknown Origin node). As a rule, the network does not tolerate *any* pirating. This BBS network is free to all users. All the SysOps are dedicated to preserving the CoCo and OS-9.

Following is a list of current RCIS Net-

continued on page 12

SUMMER SALE

SOFTWARE

Word Power 3.3: Power packed word-processor. Fast, Maximum Text Memory, 40/80 display, HELP Screen, Graphics, works with all printers, 80,000 Spell Checker, Punctuation Chkr. *The Best. Rave Reviews.* See Older Issues for more details. **$69.**

Color Schematic Designer: **$24**
RGB Patch: $**15** Screen Dump: $**15**
Maillist Pro:$**15** Comp. Checkbk:$**15**
Home Bill Manager:$**15**

ADOS 3:$**24** Ext. ADOS 3: $**29**
Smartwatch RTC: $**29** 24-to-28: $**10**

CoCo Max III: $**39** Fonts(95): $**29**
MAx 10: $**34** Fonts (36): $**14**
CGP220/NX1000 Color Driver: $**14**
Max Edit: $**14** SP Checker: $**14**

CoCo Graphics Designer: $**19**
Label Designer: $**19**
Picture,Font,Border Disks : $**7.50** ea

CoCo Util II: Xfer programs between IBM & CoCo. Req. 2 drives. $**39**
Xenocopy: xfer between 300 computers .$**79**

Autoterm: $**34** Vterm: $**39**
Telewriter 64: $**57**
VIP Database III:$**69** Calc III: $**69**

GAMES

The Quest for Thelda: $**34**
Contras:$**34** Crystal City: $**34**
Sinistaar:$**34** Kyum Gai: $**29**
(Other Sundog Games Also Available)
Treasury Pack #1,#2 & Space Pac (8 Games ea): $**29.95** each Pack.
Slots & Cards:$39 Wizd Castle:$10

BOOKS

500 Pokes, Peeks & EXECs: $16
Supplement: $9 300 Pokes: $19
All 3 Pokes, Peeks Books: $39
Color Basic Unravelled: $39
Disk Basic Unravelled: $19
Super ECB Unravelled: $19
All 3 for $49

CoCo 3 Service Manual: $**39** 2: $**29**
Multipak Service Manual: $**19**
Assembly Language Prog: $**18**
Addendum (for CoCo 3): $**12**
Full Turn of Screw (Disto): $**19**
Comp. Rainbow Guide to OS9:$19
Compl. Rain. Guide to OS9 Dsks:$**29**
Rainbow Guide OS9II:$19 Dsk:$**19**
Full Turn of the Screw: $**19**
Inside OS9 Level II: $**29**

Musica II: $29 **Lyra**:$49
Coco Midi Interf:$99 Software:$**59**

OS9 SOFTWARE

From Alpha Software .....
Data Window: $**59** Data-Merger:$**19**
Presto Partner:$**29** Level II Tools:$**24**
Disk Manag. Tree:$**29** Zapper: $**19**
Multi-Menu:$**19** Warp I:$**34**
OS9 Level II BBS:$**29**

From Burke & Burke.....
RSB: $39 EzGen:$19 Wild Card:$19

Other OS9 Software...
GSC File Xfer: $**44.95** SDISK 3:$**29**
OS9 RAMDISK (512K & 1MEG):$**29**
Screen Print Util.: $19 Menu Utill:$19
Point-&-Shoot File Selection:$**19**

HARDWARE

512K UPGRADE: The absolute best. No soldering. 120ns chips. Low-heat design. Comes with **picture** instructions & software (512K Ramtest/disk/Lightning, OS9 RAMDISK & Backup). **ONLY $79**. 0K Board:$39
1 MEG: $179 (0K: $129)
64K Upgrades for CoCo II: $29

MAGNAVOX 1CM135 RGB Color Monitor w/ Tilt, Swivel & 2 Yr. Warranty. **INCLUDES** CoCo 3 RGB Cable, Composite Cable Set & IBM Cable. Only $**298**

Disto Mini Controller: $**74**
Disto Super Controller: $**99**
Disto Super Controller II: $**104**
4-in-1 Board: $109 3-in-1: $**74**
RS232 Super Pack: $**54**

All our drives are TOP QUALITY BRAND NEW Double-Sided Drives with full 1-yr warranty. Our Drive 0 & 2 systems include Case, PS, Drive, controller, official RSDOS 200pg manual & $60 software.

Drive 0: **$199** 2 Drive Sys.: **$299**
1 Drive Cable:$16 2: $22 4:$34
Bare 51/4" Drive: $79
FD501 2nd Drive Upgrade Kit:**$99**
FD502 2nd Drive upgrade Kit:**$109**
Toshiba 3 1/2" Drive: $**79**

20 MEG Hard Drive System: **$459**
40 MEG Hard Drive System: **$549**
All our hard drive systems are complete read-to-run system for use under Basic & OS9.
CoCo XT: $**69.95** w/ RTC: $**99.95**
CoCo XT ROM: $**19.95**
HYPER IO: **$29** HYPERIII: **$12**

512K COCO 3: $229

Intronics EPROM Programmer: **$129**
Eraser: **$49** Both for **$154**

Keyboard Extension Cable: **$39**
CoCo 3 Keybd. $**39** w/ Cabl: $**69**
CoCo 2 Keybd $**29** w/ Cabl: $**49**

Zoom 2400 Modem w/ 7yr warr: $**99**
Communications Extravaganza 2400 w/ Modem, Softw., Cable: $149

Magnavox RGB Cable: **$19**
Serial-to-Parallel Interface: $**39**
15" Sheilded Multipak Extension:$**36**
40-pin Y Cable: $**34**
RGB Analog Extender: $**19**
Modem Cable (4 - 25 pin): $**15**
RS232 2 Position Switcher: $**29**
Hi-Res Joystick Interface: $**11**
Advanced Gravis Joystick: $**59**
Multipak Locking Plate: $**8**
Star Ribbons: $**8.50** Color: $12.95

RSDOS 2.1 Chip: $**29.95**
68B09E Chip: $**14** GIME Chip:$**39**
Multipak PAL Chip w/ instructions: $**15** (specify Multipak Model #)

MICROCOM SOFTWARE •1387 Brighton Henrietta Town Line Rd •Rochester,NY 14623

VISA MasterCard AMERICAN EXPRESS DISCOVER

To Order: All orders $99 & above (except Printers, Drives, Monitors, Computer) shipped 2nd Day Air at no extra Charge in Continental US. We accept Visa,MC,Discover,Amex (3% sur), check, MO & School PO's. COD Orders (<$100) within US add $5 extra. Please add 5% shipping (min $3) S&H in US & 10% (min $5) for Canada, Alaska & PR. All foreign orders except Can. pay actual shipping charges (min $5) . NYS residents please add sales tax. Monitors ($12 S&H/$40 in Can.); Drives ($10 S&H/$30 in Can); Computers ($8 S&H; $25 in Can).

For Orders (10-5) pm M-Sat: 1-800-654-5244. Tech Info & Order Status (3-5 pm): 716-292-1786

Add the IBM extended character set to the CoCo 3's graphics

Font Magician

by Geoff Friesen

When the Color Computer 3 made its debut several years ago, it provided a variety of new and exciting features for CoCo users. My favorite is the HPRINT command. Earlier CoCos required a lot of cumbersome programming to mix text and graphics. HPRINT makes it possible to combine text and graphics in a simple, straight forward manner.

Despite its benefits, however, the standard font used by HPRINT on the Hi-Res screens often leaves something to be desired. This font is limited to the 96 standard ASCII characters (codes 32 through 127, inclusive). There is no provision for special characters. It might be argued that these characters can be created via the other graphics commands, such as HLINE, but this takes away from the simplicity offered by HPRINT.

I do much of my programming with an IBM personal computer. The IBM provides a nice font with all kinds of characters. What if the Color Computer had this same font? Not only would it be possible to draw better screens, but translating IBM BASIC programs to the Color Computer would be easier.

The CoCo 3 provides two fonts: The standard font begins at $F09D and contains the ASCII character set. The second font starts at $FA0F and contains a rather uninteresting and incomplete set of puncutation and scientific characters. Each font provides enough space for 96 characters, and each character requires eight bytes. I wrote a program that loads the second font table with the last 96 characters of the IBM extended character set, as shown in Figure 1. I also devised a simple way to switch between the standard and alternate fonts, allowing your programs to display a total of 192 different characters on the CoCo 3's HSCREENs.

Geoff Friesen has a bachelor of science degree in computer programming and has written several articles for computer magazines. He can be contacted at General Delivery, Dauphin, MB R7N 2T3, Canada. Please include an SASE when requesting a reply.

Program Notes

The program in Listing 1, MKFONT.BAS, pokes the IBM character codes into the alternate font table beginning at $FA0F. MKFONT then saves this font to disk as a file called IBM.FNT.

LOADER.BAS, the program in Listing 2, first loads IBM.FNT into the table from disk. It then displays the new set of characters.

Minor Technical Notes

Those of you who like to hack around in the BASIC internals might want to know how this table switching works. When I disassembled the HPRINT command, I found the following instruction at Address $EFC8:

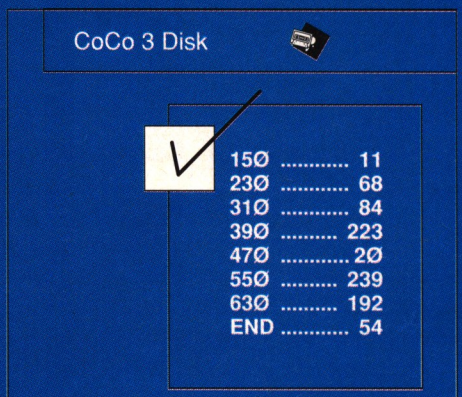
```
LDU     #$F09D
```

This instruction loads the starting address of the font table into the U register. If this address is changed to $FA0F, the alternate font table is selected.

Using Font Magician

You can use the new font when designing windows and menus. Close examination of Listing 2 reveals how you can use the IBM extended character set in your own programs. Variable CS (I used this to mean "character set") is used to select one of the tables. When a value of 0 (zero) is stored in CS, the standard font table is used. When CS is 1, the alternate table is used. The code from Line 260 to Line 275 is very important — it pokes the correct values into memory for the character set you want to use.

The IBM codes for the new characters range from 160-255, inclusive. To use one of these characters, you must first load IBM.FNT from disk (Line 120). Then select the alternate font by setting CS (or whatever variable you choose to use) to a value of 1. Subtract 128 from the IBM code for the character you want, and use HPRINT to place



Listing 1: MKFONT

```
10 'FONT MAGICIAN
20 'WRITTEN BY GEOFF FRIESEN
30 'COPYRIGHT (C) AUGUST 1991
40 'BY FALSOFT, INC.
50 'RAINBOW MAGAZINE
100 'MKFONT: MAKE IBM.FNT
105 '
110 WIDTH 32
115 PRINT "MKFONT: MAKE IBM.FNT"
120 PRINT
125 F$="IBM.FNT"
130 AD=&HFA0F
135 READ B$
140 IF B$="*" THEN 160
145 POKE AD,VAL("&H"+B$)
150 AD=AD+1
155 GOTO 135
```

the character on the screen. This is shown from Line 300 to the end of Listing 2. The characters are shown in Figure 1, along with the IBM codes and actual CoCo codes (IBM code - 128) to get them. Where applicable, the figure also includes the CoCo characters you can use to generate characters in the new font. HPRINT either the character string (CHR$), as in Listing 2, or the appropriate string of alphanumeric CoCo characters. The new font and the techniques used to display it work on all CoCo 3 HSCREENs (40- and 80-column).

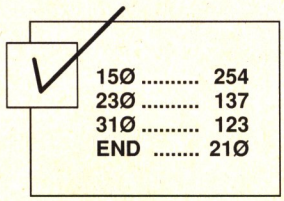
I hope you enjoy using this font. It should make programming and using the CoCo more enjoyable. ❑

Char.	IBM Code	CoCo Code	CoCo Char.
á	160	32	<SPC>
í	161	33	!
ó	162	34	"
ú	163	35	#
ñ	164	36	$
Ñ	165	37	%
ª	166	38	&
º	167	39	'
¿	168	40	(
⌐	169	41	)
¬	170	42	*
½	171	43	+
¼	172	44	,
¡	173	45	-
«	174	46	.
»	175	47	/
▒	176	48	0
▓	177	49	1
▓	178	50	2
│	179	51	3
┤	180	52	4
╡	181	53	5
╢	182	54	6
╖	183	55	7
╕	184	56	8
╣	185	57	9
║	186	58	:
╗	187	59	;
╝	188	60	<
╜	189	61	=
╛	190	62	>
┐	191	63	?
└	192	64	@
┴	193	65	A
┬	194	66	B
├	195	67	C
─	196	68	D
┼	197	69	E
╞	198	70	F
╟	199	71	G
╚	200	72	H
╔	201	73	I
╩	202	74	J
╦	203	75	K
╠	204	76	L
═	205	77	M
╬	206	78	N
╧	207	79	O
╨	208	80	P
╤	209	81	Q
╥	210	82	R
╙	211	83	S
╘	212	84	T
╒	213	85	U
╓	214	86	V
╫	215	87	W
╪	216	88	X
┘	217	89	Y
┌	218	90	Z
▉	219	91	[
▌	220	92	\
▌	221	93	]
▐	222	94	↑
▀	223	95	←
α	224	96	^
ß	225	97	a
Γ	226	98	b
π	227	99	c
Σ	228	100	d
σ	229	101	e
µ	230	102	f
τ	231	103	g
Φ	232	104	h
Θ	233	105	i
Ω	234	106	j
δ	235	107	k
∞	236	108	l
φ	237	109	m
∈	238	110	n
∩	239	111	o
≡	240	112	p
±	241	113	q
≥	242	114	r
≤	243	115	s
⌠	244	116	t
⌡	245	117	u
÷	246	118	v
≈	247	119	w
°	248	120	x
∙	249	121	y
·	250	122	z
√	251	123	
	252	124	
²	253	125	
■	254	126	
	255	127	

Figure 1:Character Codes

```
160 SAVEM F$,&HFA0F,AD-1,0
165 PRINT "FINISHED"
170 '
175 'FONT DATA (IBM 160-255)
180 '
185 DATA 1C,00,78,0C,7C,CC,7E,00
190 DATA 38,00,70,30,30,30,78,00
195 DATA 00,1C,00,78,CC,CC,78,00
200 DATA 00,1C,00,CC,CC,CC,7E,00
205 DATA 00,F8,00,F8,CC,CC,CC,00
210 DATA FC,00,CC,EC,FC,DC,CC,00
215 DATA 3C,6C,6C,3E,00,7E,00,00
220 DATA 38,6C,6C,38,00,7C,00,00
225 DATA 30,00,30,60,C0,CC,78,00
230 DATA 00,00,00,FC,C0,C0,00,00
235 DATA 00,00,00,FC,0C,0C,00,00
240 DATA C3,C6,CC,DE,33,66,CC,0F
245 DATA C3,C6,CC,DB,37,6F,CF,03
250 DATA 18,18,00,18,18,18,18,00
255 DATA 00,33,66,CC,66,33,00,00
260 DATA 00,CC,66,33,66,CC,00,00
265 DATA 22,88,22,88,22,88,22,88
270 DATA 55,AA,55,AA,55,AA,55,AA
275 DATA DB,77,DB,EE,DB,77,DB,EE
280 DATA 18,18,18,18,18,18,18,18
285 DATA 18,18,18,18,F8,18,18,18
290 DATA 18,18,F8,18,F8,18,18,18
295 DATA 36,36,36,36,F6,36,36,36
300 DATA 00,00,00,00,FE,36,36,36
305 DATA 00,00,F8,18,F8,18,18,18
310 DATA 36,36,F6,06,F6,36,36,36
315 DATA 36,36,36,36,36,36,36,36
320 DATA 00,00,FE,06,F6,36,36,36
325 DATA 36,36,F6,06,FE,00,00,00
330 DATA 36,36,36,36,FE,00,00,00
335 DATA 18,18,F8,18,F8,00,00,00
340 DATA 00,00,00,00,F8,18,18,18
345 DATA 18,18,18,18,1F,00,00,00
350 DATA 18,18,18,18,FF,00,00,00
355 DATA 00,00,00,00,FF,18,18,18
360 DATA 18,18,18,18,1F,18,18,18
365 DATA 00,00,00,00,FF,00,00,00
370 DATA 18,18,18,18,FF,18,18,18
375 DATA 18,18,1F,18,1F,18,18,18
380 DATA 36,36,36,36,37,36,36,36
385 DATA 36,36,37,30,3F,00,00,00
390 DATA 00,00,3F,30,37,36,36,36
395 DATA 36,36,F7,00,FF,00,00,00
400 DATA 00,00,FF,00,F7,36,36,36
405 DATA 36,36,37,30,37,36,36,36
410 DATA 00,00,FF,00,FF,00,00,00
415 DATA 36,36,F7,00,F7,36,36,36
420 DATA 18,18,FF,00,FF,00,00,00
425 DATA 36,36,36,36,FF,00,00,00
430 DATA 00,00,FF,00,FF,18,18,18
435 DATA 00,00,00,00,FF,36,36,36
440 DATA 36,36,36,36,3F,00,00,00
445 DATA 18,18,1F,18,1F,00,00,00
450 DATA 00,00,1F,18,1F,18,18,18
455 DATA 00,00,00,00,3F,36,36,36
460 DATA 36,36,36,36,FF,36,36,36
465 DATA 18,18,FF,18,FF,18,18,18
470 DATA 18,18,18,18,F8,00,00,00
475 DATA 00,00,00,00,1F,18,18,18
480 DATA FF,FF,FF,FF,FF,FF,FF,FF
485 DATA 00,00,00,00,FF,FF,FF,FF
490 DATA F0,F0,F0,F0,F0,F0,F0,F0
495 DATA 0F,0F,0F,0F,0F,0F,0F,0F
500 DATA FF,FF,FF,FF,00,00,00,00
505 DATA 00,00,76,DC,C8,DC,76,00
510 DATA 00,78,CC,F8,CC,F8,C0,C0
515 DATA 00,FC,CC,C0,C0,C0,C0,00
520 DATA 00,FE,6C,6C,6C,6C,6C,00
525 DATA FC,CC,60,30,60,CC,FC,00
530 DATA 00,00,7E,D8,D8,D8,70,00
535 DATA 00,66,66,66,66,7C,60,C0
540 DATA 00,76,DC,18,18,18,18,00
545 DATA FC,30,78,CC,CC,78,30,FC
```

```
550 DATA 38,6C,C6,FE,C6,6C,38,00
555 DATA 38,6C,C6,C6,6C,6C,EE,00
560 DATA 1C,30,18,7C,CC,CC,78,00
565 DATA 00,00,7E,DB,DB,7E,00,00
570 DATA 06,0C,7E,DB,DB,7E,60,C0
575 DATA 38,60,C0,F8,C0,60,38,00
580 DATA 78,CC,CC,CC,CC,CC,CC,00
585 DATA 00,FC,00,FC,00,FC,00,00
590 DATA 30,30,FC,30,30,00,FC,00
595 DATA 60,30,18,30,60,00,FC,00
600 DATA 18,30,60,30,18,00,FC,00
605 DATA 0E,1B,1B,18,18,18,18,18
610 DATA 18,18,18,18,18,D8,D8,70
615 DATA 30,30,00,FC,00,30,30,00
620 DATA 00,76,DC,00,76,DC,00,00
625 DATA 38,6C,6C,38,00,00,00,00
630 DATA 00,00,00,18,18,00,00,00
635 DATA 00,00,00,00,18,00,00,00
640 DATA 0F,0C,0C,0C,EC,6C,3C,1C
645 DATA 78,6C,6C,6C,6C,00,00,00
650 DATA 70,18,30,60,78,00,00,00
655 DATA 00,00,3C,3C,3C,3C,00,00
660 DATA 00,00,00,00,00,00,00,00
665 DATA *
```



Listing 2: LOADER

```
10 'FONT MAGICIAN
20 'WRITTEN BY GEOFF FRIESEN
30 'COPYRIGHT (C) AUGUST 1991
40 'BY FALSOFT, INC.
50 'RAINBOW MAGAZINE
100 'LOADER: IBM.FNT LOADER
105 '
110 'INITIALIZE
115 '
120 LOADM "IBM.FNT"
125 CS=1: GOSUB 260
130 CMP: HSCREEN 2: HCLS 14
135 HCOLOR 1: PALETTE 1,51
140 '
145 'DRAW MAIN BOX
150 '
155 C=1: R=1: NC=39: NR=22
160 GOSUB 300
165 '
170 'DRAW CHARACTER SET
175 '
180 I=32: R=3: C=3
185 HPRINT (C,R),CHR$(I)
190 C=C+2: IF C<38 THEN 200
195 C=3: R=R+2
200 I=I+1: IF I<128 THEN 185
205 '
210 'DRAW MESSAGE AND BOX
215 '
220 C=28: R=16: NC=9: NR=3
225 GOSUB 300
230 CS=0: GOSUB 260
235 HPRINT (C+1,R+1),"IBM.FNT"
240 GOTO 240
245 '
250 'TOGGLE HPRINT CHAR SETS
255 '
260 IF CS=0 THEN X=&HF0:Y=&H9D
265 IF CS=1 THEN X=&HFA:Y=&H0F
270 POKE &HEFC9,X
275 POKE &HEFCA,Y
280 RETURN
285 '
290 'DRAW BOX
295 '
300 UL$=CHR$(201-128)
305 UR$=CHR$(187-128)
310 LL$=CHR$(200-128)
315 LR$=CHR$(188-128)
320 HL$=CHR$(205-128)
325 HL$=STRING$(NC-2,HL$)
330 VL$=CHR$(186-128)
335 HPRINT (C,R),UL$
340 HPRINT (C+1,R),HL$
345 HPRINT (C+NC-1,R),UR$
350 FOR I=1 TO NR-2
355 HPRINT (C,R+I),VL$
360 HPRINT (C+NC-1,R+I),VL$
365 NEXT I
370 HPRINT (C,R+NR-1),LL$
375 HPRINT (C+1,R+NR-1),HL$
380 HPRINT (C+NC-1,R+NR-1),LR$
385 RETURN
```


SUPER SUPER SPECIAL

All 530 Public Domain Programs-$145 Value
All 1,020 Subscription Programs-$260 Value
All 250 Graphic Pictures-$70 Value
ENTIRE PACKAGE Regularly $475

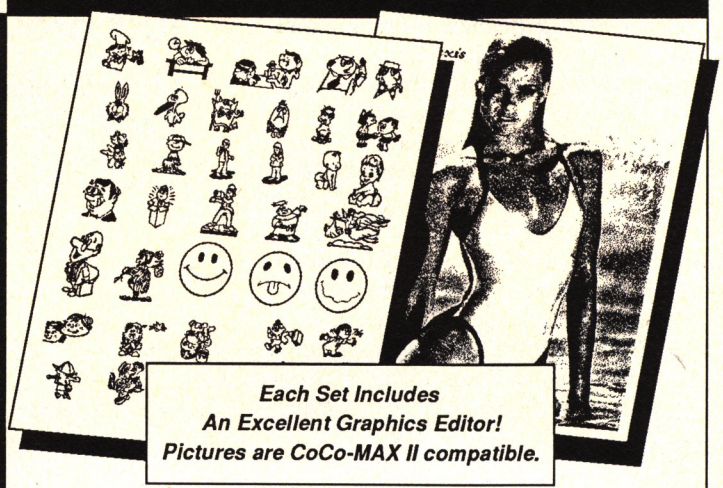
Now Only...

VISA MasterCard

$279.00!

SEE PAGE 39 FOR DETAILS

Over 250 Quality Pictures



Each Set Includes
An Excellent Graphics Editor!
Pictures are CoCo-MAX II compatible.

Each Set Of 10 Disks
Only $35.00 !
Buy 2, Get One Free!

Set #1	Set #2	Set #3
Clipart	Celebrities	Adult Only
Space Pictures	Cartoon Characters	R-Rated
Animals	Great Graphics	Beautiful Women
More	More	

T&D Subscription Software • 2490 Miles Standish Dr., Holland, Mi 49423 • 616-399-9648

Print#-2

A 'festive Review

I know the focus of this issue of THE RAINBOW is graphics, which is one of my favorite subjects, but I want to talk about the CoCo Community in general and this past April's RAINBOWfest in particular.

We had one of our better RAINBOWfests in Chicago the last weekend in April. Although the show was a little smaller than it has been due to a fewer number of exhibitors and attendees, everyone I spoke with was very pleased with the turnout on both sides.

This is, after all, the secret of the CoCo Community: Lots of people from lots of places meeting to talk about their favorite computers, to see the new offerings from vendors and to just plain have fun.

Our CoCo Community Breakfast was completely sold out, all our 'fest T-shirts were gone before noon on Saturday, and Delphi Saturday Night was extremely well-attended.

Most important, I think, was the confidence expressed about the CoCo and its future from everyone with whom I spoke. And the recurrent theme was something we have known for years and years — the Color Computer is an excellent machine that will serve many, many needs for many more years.

It was also good to see so many new products introduced at RAINBOWfest. It just proves once again that the spirit of CoCo is well. I predict your Color Computer will be around — and useful — for many years to come.

Also sparking interest at RAINBOWfest was the exhibition of *production* models of two computers that are vying to become the "CoCo 4" machine — the System IV from Delmar Company and the TC-9 Tomcat from Frank Hogg Laboratory. (FHL also showed the TC-70.) A third computer, the MM/1, which has no production date yet, was shown by IMS.

It was good to see so many new products introduced at RAINBOWfest. It just proves once again that the spirit of CoCo is well.

THE RAINBOW plans full-scale reviews of production models of these machines as well as other machines that may come to market in the future. A major part of our criteria, of course, is that the machine is available to you for purchase, should you desire to do so. We will review no computer that is not an actual production machine.

I chaired a seminar on Saturday at RAINBOWfest that featured representatives of IMS, Delmar and Frank Hogg Laboratory. In response to my questions, Delmar said if a computer is ordered, it should be received by the purchaser within two weeks; Hogg said it would be received "in June" due to back orders and IMS said it had no shipping date at that time. Based on these estimates, we expect to review the available machines between now and the end of the year.

In connection with this, we also plan more reviews of software available to run on these machines as the software becomes available to us. We intend to be able to tell you what software runs on which machines, to a greater or lesser degree, and what peripherals run on the machines (those you now own for your CoCo and new equipment which you might want to purchase).

Looking into our own future, THE RAINBOW intends to somewhat broaden its coverage of 68000-based computing, but has no intention of neglecting basic coverage of the Color Computer. Thus, no matter what sort of system you have, THE RAINBOW will continue to provide support for you.

Probably the most-asked question I answered at RAINBOWfest was if we plan to end our coverage of purely "CoCo" computers and computing. I answered by telling all those who asked that, since sometime in 1982, not a *single* day (except for one last August, always our worst month) has gone by when there has not been a *new* subscription order for THE RAINBOW in our mailbox.

This means, of course, that new members are joining the ranks of our CoCo Community every day and we owe them the support they need to learn to use their computers effectively. At the same time, we acknowledge many of you want a little more technical information.

It is called striking a balance. Fortunately, the CoCo Community is big enough for all of us.

— Lonnie Falk

Wake up and smell the CoCo!

Bring your drawings and designs to vivid, colorful life with the amazingly popular CoCo Max III!

NOW $39.95

Zoom! Rotate! Animate! 13 Fantastic Fonts! 40 paint brush shapes! CoCo Max III dazzles the eye! Get crisp, clear picture resolution (two full hi-res 320×192 screens)... a big, big edit window... 28 "eat-your-heart-out" drawing tools. Rotate at miniscule 1.5° angles. Undo boo-boos with a click. Animate for special effect. Pick'n'choose from 16 colors out of 64. Go absolutely fruity with fonts (8 sizes, 5 styles & more available!) and an astounding 40 different brush styles! No wonder this software is recognized as the CoCo community's all-time favorite!

Works with both 128K and 512K. Colors print in 5 shades of gray. Printers supported: Epson RX, FX, MX, LX and compatibles; Star/Gemini NX-10, NX-1000; DMP100, 105, 106, 110, 120, 130, 200; OKI 82A, 182, 192 CGP-220 (B&W).

CoCo Max III Add-Ons

Max Fonts disks: 95 fonts on 4 disks. ..... **Now only $29.95**
Or two sets of two disks each **$14.95**
Max Edit The font editor as creative as your imagination **Only $14.95**
Color Printer drivers NX-1000 Rainbow. CGP-220 and Okimate 20. For glorious color that wins hands down! **$14.95**

Get Max-10 – the CoCo word processor that's fun and furiously fast!

NOW AT LOWEST EVER PUBLISHED PRICE OF $34.95

Get that easy-as-pie Macintosh feel without giving up your first-born! This program will stretch your CoCo to the limit. Mix graphics, text, large headlines, arrange multiple columns, you name it... Max-10 will swiftly oblige. Includes paper-saving full-page preview (graphics, too!) to make your prose look proud. This is the CoCo word processor that will leave you speechless. Printers supported: Epson FX, MX, RX, LX and compatibles; DMP 105, 106, 130; CGP 220 (B&W); OKI 182, 92, 192; STAR NX-10, NX-1000.

Max-10 Add-Ons

Max-10 Fonts 36 super fonts on 2 disks. Call for list. .... **Now $14.95**
Spell Checker 35,000 word dictionary. Online spell checking to make you look the perfect professional. **$14.95**

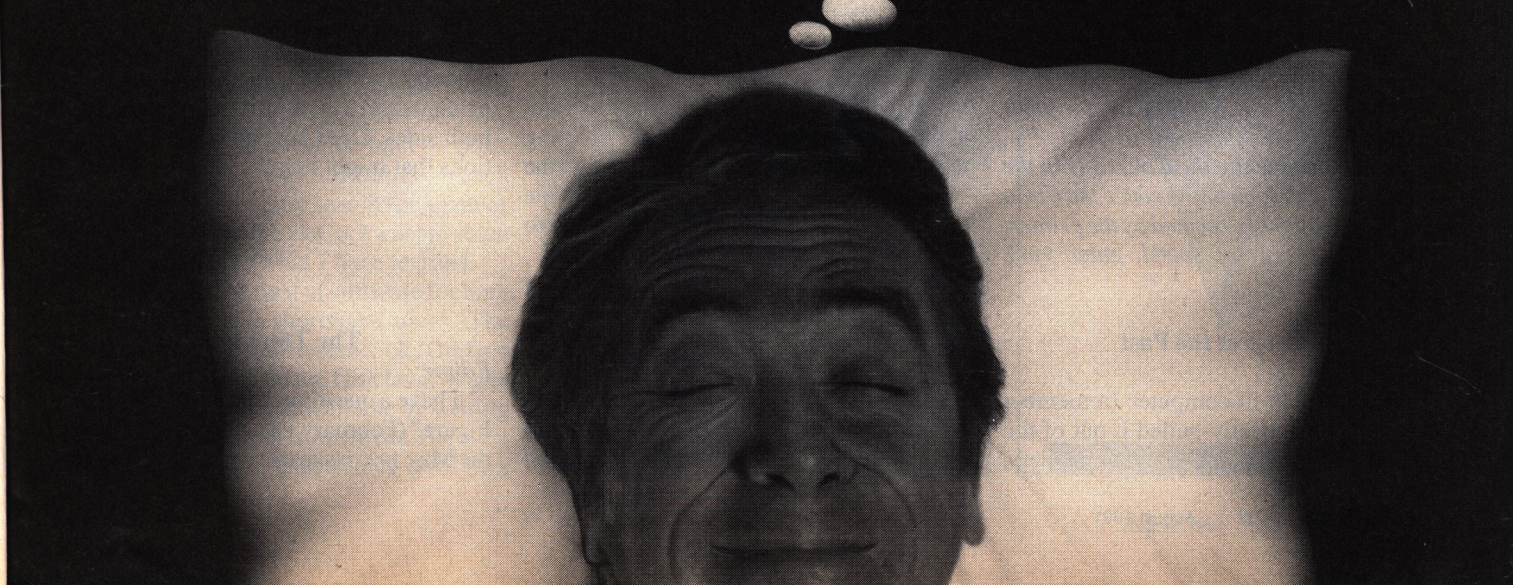
Buy both CoCo Max III and Max-10 $49.95

Call 1-800-221-0916 *1-203-259-7713*

How to order: Use Visa, Mastercard or M.O. C.O.D. add $4.00 extra. Purchase Orders subject to credit approval. Connecticut residents add 8% sales tax. Shipping $4.00 per order, usually UPS ground. UPS 2nd day air $6.00 extra. Next day service available. Canada: $6.00 per order (Airmail). Outside U.S. & Canada add 10% of order total.

COLORWARE

303 Linwood Ave.
Fairfield, CT 06430



work Systems. Please post the numbers or just talk about the network so OS-9 users can be made aware of a nearby system.

RCIS Headquarters/New Milford, NJ/(201) 967-1061
Color Galaxy MW/Laguna Hills, CA/(714) 831-6530
Foundation/Ridge Manor, FL/(904) 583-4320
Color Galaxy AN/Santa Ana, CA/(714) 545-5156
Chip to Chip/Sydney, NS, Canada/(902) 567-2262
Color Galaxy PG/Riverside, CA/(714) 768-7155
Arthurs Court/Palm Springs, CA/(619) 320-5072
Unknown Origin/Parsippany, NJ/(201) 402-6352

Scott Amendolaro
11 Alba Place
Parsippany, NJ 07054

Blown-a-Link

Editor:

I have installed my CoCo 3 in an eight-slot PC box. Due to space limitations, I had to link the bus of the CoCo to the controller with a ribbon cable. Now all of it works fine, except the system doesn't work in No-Halt mode (I use OS-9).

Also, when I tuned it (by shortening the distance of the two connectors on the cable), my main 68B09E CPU blew up. I had to order another. Has somebody solved this problem, either by software patches and/or hardware alterations?

Maarten AMJ Van Wamelen
3 Lynmetestraat
Oedelem, Belgium 8730, EEC
Motd #2894

"Interrupted Again" on Page 28 of this issue might be of use to you.

Alternating Speeds

Editor:

In the article titled "Turbo Light" (May 1991, Page 53), it was indicated that the clock speed of a CoCo 3 could be increased from 0.89 MHz to 1.7 MHz by entering `POKE 65497,0`. Although the high speed is great, it scrambles the output of my TP-10 printer. Are these problems connected? How do I get out of the high-speed mode short of turning the computer off?

Brian Matosian
11655 Laurelwood Drive
Studio City, CA 91604

Yes! To print while the CoCo 3 is in the high-speed mode, you must reduce the CoCo 3's baud to half *that expected by the printer. To return to normal speed, enter* `POKE 65496,0`.

A Look at the Past

Editor:

I have an MC-10 computer (remember those?), and I recently pulled it out of the closet. Do you, or any of your readers, know where I can find a terminal program or any other software or hardware for it? Although it does not have much use, I kind of cherish it and would like to use it as a terminal to hook up to my CoCo 3.

I remember an issue, or issues, of THE RAINBOW about the MC-10. I would like to order these issues if at all possible.

Adam Scott
P.O. Box 37
Taylorstown, PA 15365

OK, following is a list of articles names along with issue and page number. Happy hunting!

"Peeking Into the Hidden Commands"
— Sep. 83, Page 99
"MC-10 Memory Map"
— Jan. 84, Page 309
"Prospecting the MC-10"
— Feb. 84, Page 314
"Kid CoCo is No Lightweight"
— Aug. 83, Page 174
"Opening CoCo's Library"
— Oct. 83, Page 196
"A Command Summary"
— Sep. 83, Page 101
"Two for the 10"
— Aug. 83, Page 67

Tic Tac/Blackjack

Editor:

I need help. I recently entered two programs into my computer: *Tic-Tac* (April 1991, Page 50) and *Blackjack* (March 1991, Page 10). I have identical problems with both programs.

After correcting all typos and thoroughly checking both programs against their listings, I decided to run *Tic-Tac*. (This was several days after I turned off all my equipment.) I got a UL error in Line 11, which says `GOSUB 911`. I tried to go to Line 911 and found I couldn't list any lines after Line 11. But I could list the entire program if I turned the system off and started it again.

So, I started again and listed the program from the beginning and watched it carefully as it printed. I found a mystery line number, Line 12601, after Line 532. And Line 532 had been changed!

I fixed this, and when I ran the program, it functioned perfectly. But after shutting the system off and starting it again, the same thing occurred, but with different line numbers. The same thing happens with *BlackJack*. What is happening?

Charles Freiburg
2503 Hamilton Avenue
Glenshaw, PA 15116-1907

We'll keep checking on our end but it sounds to us like you saved the program to disk while the CoCo was in the high-speed mode. Doing this garbles the file, often in strange places. And it's easy to do. Tic-Tac *uses the high-speed poke. If you make corrections, run the program to check it, then immediately save it to disk, it will be saved at high-speed. If this is the case, the file is* permanently *garbled. Always enter* `POKE 65496,0` *to slow the computer down before saving a program.*

Another possibility is that the connectors on the disk controller are getting dirty. Clean them using a pencil eraser and see if that helps.

Anyone Seen Bob?

Editor:

I recently purchased a CoCo 3 and remembered a program called *CoCo 3 Cribbage* written by Bob Van der Poel. The program was mentioned in his fall 1987 newsletter. I wrote to inquire about the program but, to my dismay, the letter was returned with no forwarding address. I have some excellent programs written by Bob and would really like his *CoCo 3 Cribbage* program, if possible. Does anybody out there in CoCo land know where this super CoCo programmer lives now?

Glenn Taylor
Box 1221
Lusk, WY 82225

The most recent address we have for Bob van der Poel Software is:

P.O. Box 57
Wynndel, B.C. V0B 2N0
Canada

RAM Disks

Editor:

I have recently used `RDSK.BAS` by Daniel Jimenez and found it worked perfectly. I wonder if anyone else who has used it knows how (if it's possible) to generate more than 27 granules on the RAM disk or to make it compatible with binary programs like `REMOTE2.SYS` and `DU3.BIN`. Are there any other RAM-disk programs that operate on a 128K CoCo 3?

I own an FD-502 double-sided disk drive made by Tandy, but when I boot `BOOT6.BIN` or `CHARGER.BIN`, I still am unable to use both sides. Does anyone have any suggestions that might help?

Richard Melnick
RR 2, Site 7, Comp B-1
Kingston, NS B0P 1N0
Canada

The Total Figure

Editor:

I have a question concerning "The Total Figure" (February 1990, Page 27). Page 45 of the May 1990 issue of THE RAINBOW carried

a correction that stated the "save and load functions will not work with Extended Color BASIC Version 1.0."

I have a CoCo 3, which I understand is Version 2.1, yet I am unable to successfully run this program. I retyped it to make sure and used all methods to debug it, but no luck. Is the version in the May correction in error or did I miss a later correction?

Floyd Jackson
Wheelersburg, Ohio

The program does not save or load files correctly with Disk BASIC 1.0 or 2.0, or with ADOS. *However, there should be no problem using it with Disk BASIC 1.1 or 2.1. Just because you have a CoCo 3 does* not *mean you have Disk BASIC 2.1. Check the first line on the CoCo 3 screen when you first turn on the computer.*

Program Protection

Editor:

I'm an eighth grader who is just learning to program with a CoCo 3. I am writing a diary program (for my sister) that would require entering a code to get in the file, but pressing the BREAK key makes the codes useless. It would also be possible to use `LIST` to enter the program. Could you show me a simple step to disable keys and commands?

Danny Queck
21 Vale Drive
Vincentown, NJ 08088

Bunches of pokes to disable CoCo functions can be found in the Pokes, Peeks 'n Execs *series of books from Microcom Software. To disable the BREAK key, enter*

```
POKE &HE414,0:POKE &HE42A,0
```

To restore the BREAK function, enter

```
POKE &HE414,3:POKE &HE42A,3
```

Share and Share Alike

Editor:

Thank you for publishing my letter in the April issue. I've been a loyal reader since 1984, and I found out firsthand what CoCo Community really means. Every day it seems I find a letter in the mail — postmarked from Maine to California — each one offering help in my search for amateur radio software for the CoCo. I want to share with other readers what I have learned.

There is a great deal of software for both amateur-radio and shortwave users. The problem is knowing where to look. The first source is Marty Goodman. His classic *Wefax* and *RTTY* programs are available by writing to him in care of THE RAINBOW. The next source is Dynamic Electronics (P.O. Box 896, Hartselle, AL 35640). This company has too many programs to list, but they offer a catalog. I purchased the Morse terminal program and it works great. The service was excellent and the program worked as advertised. The next source is courtesy of Steve Ford. AMSAJ (P.O. Box 27, Washington, DC 20044) is offering a new satellite-tracking program for the CoCo 3. The price for nonmembers is $49.95. *CoCoPact* and *CoCoPact3* (both with numerous features and PBBS software) for packet radio come on one disk. For further information write to Monty W. Haley (WJ5W), Route 1, Box 210-B, Evening Shade, AR 72532. Last, but not least, is an RTTY program for a terminal unit. It has a split-screen, SELCAL, several Baudot speeds and 300-baud ASCII. Write to James Sanford (WBAGC), 20 Glen Forest Drive, Hampton, VA 23669.

I hope this information will help end the myth of no amateur software for our beloved CoCo. Thanks again to THE RAINBOW, and thank you to the very-much-alive-and-well CoCo Community!

Ed Howell
Caledonia, New York

Disassembling BASIC

Editor:

I am a 17-year-old computer programmer who works with both Extended Color BASIC 2.1 and 6809 assembly language. I have a CoCo 3 and wonder if you could point me to an easy-to-understand book or manual that disassembles the BASIC ROM. I am looking for the addresses of BASIC's commands (i.e., BASIC's `CLS` command is located at $A928, etc.) Please help!

Jason Smith
329 Railroad Street
Tamaqua, PA 18252-1334

For disassemblies and memory maps, check out the Unraveled *series written by Spectral Associates and sold by Microcom Software.*

THE RAINBOW welcomes letters to the editor. Mail should be addressed to: Letters to Rainbow, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. Letters should include the writer's full name and address. Letters may be edited for purposes of clarity or to conserve space.

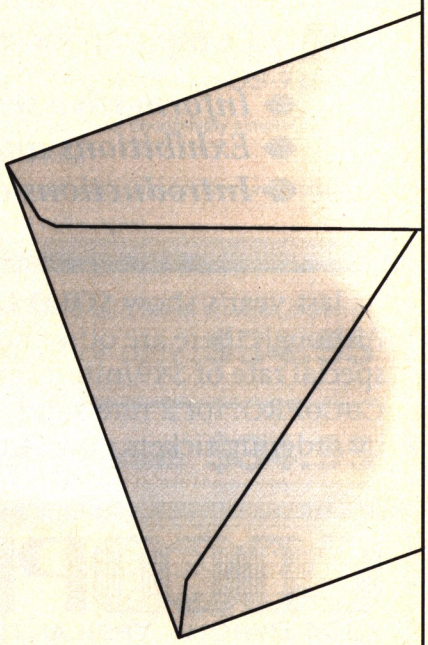
Letters to the editor may also be sent to us through our Delphi CoCo SIG. From the CoCo SIG> prompt, type `RAI` to take you into the Rainbow Magazine Services area of the SIG. At the RAINBOW> prompt, type `LET` to reach the LETTERS> prompt and then select Letters for Publication. Be sure to include your complete name and address.

About Your Subscription

Your copy of THE RAINBOW is sent second class mail. You must notify us of a new address when you move. Notification should reach us no later than the 15th of the month prior to the month in which you change your address. Sorry, we cannot be responsible for sending another copy when you fail to notify us.

Your mailing label also shows an account number and the subscription expiration date. Please indicate this account number when renewing or corresponding with us. It will help us help you better and faster.

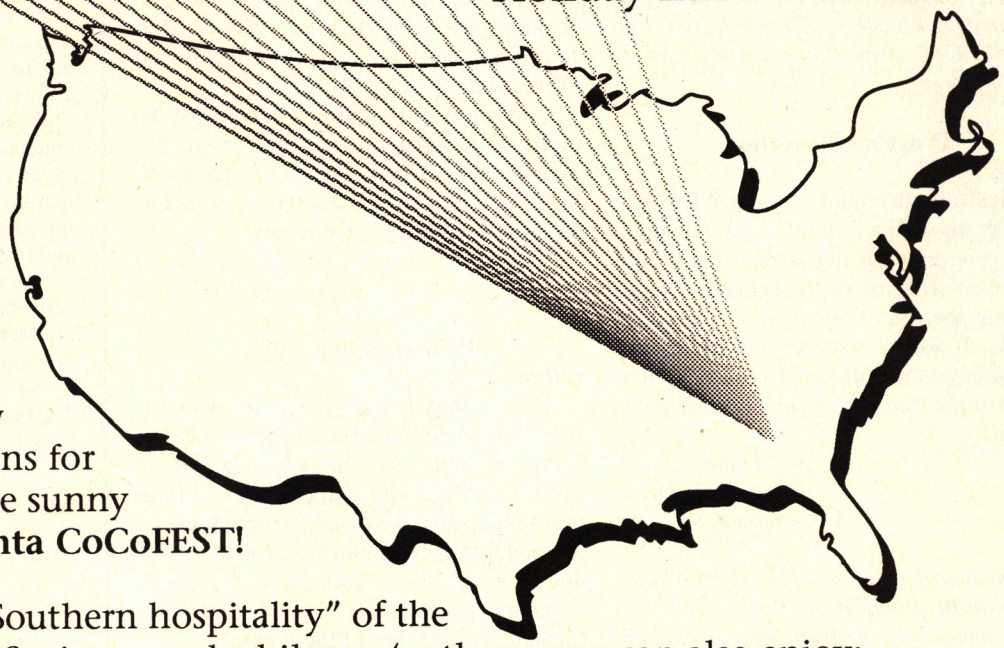
For Canadian and other non-U.S. subscribers, there may be a mailing address shown that is different from our editorial office address. Send your correspondence to our editorial offices at Falsoft, Inc., The Falsoft Building, P.O. Box 385, Prospect, KY 40059.



2nd Annual Atlanta CoCoFest

October 5-6, 1991

Holiday Inn Northlake



Well, once again CoCoPRO! invites you to join with hundreds of fellow CoCo/OS-9/OSk fans for 2 days of fun in the sunny South, at the **Atlanta CoCoFEST!**

Come enjoy the "Southern hospitality" of the Atlanta Computer Society...and while you're there, you can also enjoy:

- ***Informative seminars from the "gurus" of CoCo, OS-9, and OSk!***
- ***Exhibitions and special show prices from your favorite vendors!***
- ***Introductions of innovative NEW products for CoCo/OS-9, and OSk!***

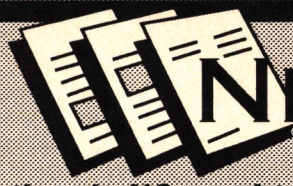
As last year's show **SOLD OUT** the hotel, we are accepting reservations a bit earlier this year. Although there are other hotels nearby, you can enjoy the convenience of staying onsite at the special rate of $49/nite + tax...and, as a special bonus, the **FIRST 50** to place a reservation thru **CoCoPRO!** for 2 nite's stay, will recieve one **FREE full-show admission!** Also, you can **save $5** by ordering tickets now at the presale price of **$12** for **One-day**, or **$15** for a **Full-show** pass!

COCOPRO!
1334 BYRON YPSILANTI MI 48198

VISA/MC ORDERS 1.800.937.7746
ALL OTHER CALLS 1.313.481.3283
1-9 PM EST MON-SAT

Include $1 S&H on all ticket orders. COD $4 additional.

Modem users can order tickets, place reservations, or order any CoCoPRO! product, by calling our BBS at (313)292-4713



NEWSPAPER09

Finally, there's NO need to leave OS-9 to produce sophisticated-looking newsletters, signs, or documents! Create headlines & columned text, bring in different fonts, pictures, fill patterns, and text, and create publications with that PRO-look! Comes complete with fonts, pictures, and fills, ready-to-run! Req. 256k CC3, OS-9 lv 2.

Owners of Newspaper Plus may upgrade to Newspaper09 for only $25 & original disks. **$48.95**

CoCoPRO! RS-232 PAK & KIT

Created by Marty Goodman. FULLY-compatible with the Slotpak-3, Multipak, or Y-cable. Buy this re-engineered Tandy DC Modem pak complete, or purchase the kit and convert your own pak!

Pak- $44.95 Kit- $26.95

DISTO

Super Controller II (no-halt)	**$109**
One-meg upgrade	**$159**
Super Controller I (4-DOS)	**$89**
Eprom Programmer	**$49**
HDISK w/RS-232	**$59**
HDISK	**$49**

Adaptec 4000a hard disk board **$99**
Rare SCSI board, use with Disto.

512k Upgrade w/Lightning software **$74**
The BEST! 120ns DRAM, PP board

Slotpak-3 Multipak replacement. **$89**
12-volt adapter for above **$15**

DMA

THE DISK MANAGER'S APPRENTICE

DMA is a new file management utility set for use with the CoCo-3 under DECB. Each utility in the set has been especially created to aid in organizing disks and the files they contain. These utils are combined into a single environment called DMA. Once booted, all utils are memory-resident.

DMA features full wildcard file-handling, point-and-select filename features w/tagging, and 8 online help screens. MANY more features than any similar product. Get your disks organized quickly & easily, with DMA!

$29.95

TOOLS II

Introducing a NEW set of 27 OS-9 lv 2 tools to make your computing life easier! Get Window Utilities (such as a screen-saver, global search & replace w/wildcards, a go command to easily change directories, and more), Process Scheduling utils such as alarm & demon (background task mgr., w/scheduling), Script File utils like recobbler, I/O Port utils including an autodialer for voice calls (stop redialing!), and many more. You'll wonder how you've done without these!

All 27 utilities can be yours for only $34.95

All Alpha Software products now available on 3½ inch 720k diskettes for only $3 more!

Data Merger	**$19.95**	**Level II Tools**	**$24.95**
Disk Mgr. Tree	**$29.95**	**The Zapper**	**$19.95**
Multi-Menu	**$19.95**	**OS9 Lv2 BBS**	**$29.95**
Presto-Partner	**$29.95**	**Data Windows**	**$59.95**

ColorSystems

Quality software for the Multivue/OS-9 user

- ***Minefield-*** deductive reasoning at its most deceptively simple!
- ***Seabattle-*** "Battleship" for OS-9/Mvue!
- ***Knightsbridge-*** unique variant of chess, with an element of chance!
- ***CoCothello-*** the strategy game of the ages!
- ***CoCo Yahtzee-*** classic family dice game comes to your screen!

Requirements: 256k CC3, joystick, OS-9 l2, & Mvue WindInt module.

Special package- all 5 for only **$34.95**

OS-9 Lv 2 Operating System **$34.95**

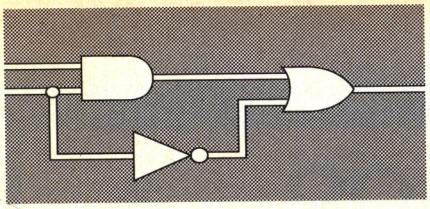
COCOPRO!

1334 BYRON YPSILANTI MI 48198

Include $4 S&H on all U.S. orders, 10% CDN. COD $4 additional. VISA/MC add 5%. No P.O. Boxes, please, as we usually ship UPS.

VISA/MC ORDERS 1.800.937.7746
ALL OTHER CALLS 1.313.481.3283
1-9 PM EST MON-SAT

For a 12-mo. subscription to our catalog of used soft- & hardware at INCREDIBLE prices (20-90% off), send $15



The System Calls

by Greg Law
Technical Editor

Before we get into the details of handling system calls, turn to Chapter 8 of the Technical Reference section of the OS-9 Level II manual. Under the heading Calling Procedure, the manual states you must load the 6809 registers with the appropriate values and execute an SWI instruction followed immediately by the system call code. The examples at the top of Page 8-2 show two techniques of using the I$Close system call with assembly language. I don't think we are quite ready to use embedded assembly-language source, so we need to find another technique.

Turn to Page 3-26 of the C Compiler manual and read the description of the _os9() function. According to the manual, this function allows you to use virtually any OS-9 system call without resorting to assembly-language routines. Using the F$ID system call as an example, this function can be written as shown in Listing 1. The os9.h header file is included because the registers structure and the system call mnemonics are defined in this file. Note that both Proc_ID and User_ID are declared as pointers. Normally functions can return only one value, but this function needs to return both the Process ID and the User ID to the calling function. By declaring both parameters as pointers, the calling function can obtain both values as shown in Listing 2. However, the calling function declares Proc_ID and User_ID as integers — not pointers — and passes the address to Get_ID() by using the address-of (&) operator. This same technique is used with the registers structure.

You may wonder why pointers aren't being used. First of all, remember that pointers *point* to objects. To understand this, assume a character is stored somewhere in memory. This can be illustrated by the following declaration:

```
char c;
```

For the sake of argument, assume Variable c is stored at Address $0100 in memory and has the value of A ($41). Now let's declare an integer and call it i.

```
int i;
```

Assume variable i is stored at Address $0101. Through the use of the address-of operator, the program can assign the address of Variable c to Variable i as follows:

```
i = &c;
```

You can now say that Variable i contains the value $0100, which is the address of Variable c. Variable c contains the value A ($41). The actual block of memory looks like

Address	Value
0100	41
0101	01
0102	00

Theoretically, there are three *values* associated with Variable i. The value of i is $0100, the address of i (&i) is $0101 and the value pointed to by i (*i) is $4101 — remember that i is an integer (two bytes). However, i is not declared as a pointer and therefore cannot be used with the pointer operator (*).

This is basically how pointers work, with a few exceptions. The most important exception is that a pointer declaration, such as char *ptr, allocates a two-byte memory area to store the address of the object to which it points. The memory required to store the object is *not* allocated. The effective result is that a pointer initially points to an arbitrary location in memory. This requires you to add code to allocate a block of memory large enough to store the object and to assign the address of this block of

```
typedef struct
{
     unsigned DAT_Image;       /* DAT Image pointer */
     unsigned Block_Size;      /* Size of the block */
     unsigned Block_Offset;    /* Offset of the module in block */
     unsigned Link_Count;      /* Module link count */
} MOD_DIR;
```

Figure 1: Module Directory Structure

In addition to being OS-9 Online SIGop, Greg Law enjoys programming on all types of computers and has worked on systems ranging from the CoCo to the Burroughs B6700 super mainframe. He lives in Louisville, Kentucky.

```
typedef struct
{
     unsigned Sync_Bytes;          /* Sync Bytes */
     unsigned Mod_Size;            /* Module Size */
     unsigned Name_Offset;         /* Offset to module name */
     char     Type_Lang;           /* Type / Language byte */
     char     Attr_Rev;            /* Attribyte / Revision byte */
     char     Parity;              /* Header parity check */
} MOD_HDR;
```

Figure 2: Module Header Format

memory to the pointer. One method of doing this with a pointer-to-type character is as follows:

```
char *ptr;
ptr = malloc(sizeof(char));
```

This same technique can be used with the `registers` structure as follows:

```
struct registers *regs;
regs = malloc(sizeof(struct regi
sters));
```

Because of the inherent complexities involved with pointers, it is easier to declare the variables and structures as non-pointers and use the address-of operator in the examples discussed so far.

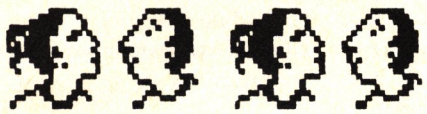
Back to the discussion of the `F$ID` system call. You can also split this function into two separate functions — `getpid()` and `getuid()` — as in the original library. The two separate functions can be written as shown in listings 3 and 4. As with the function in Listing 1, the `registers` structure is declared and the `F$ID` system call is used to get the Process ID and User ID. However, `getpid()` returns only the Process ID and `getuid()` returns only the User ID — although I used a trick with the Process ID in both listings 1 and 3 that may look strange.

You may recall that the Microware C Compiler stores a character value as an 8-bit (one-byte) signed value and stores an integer value as a 16-bit (two-byte) signed value. This is documented on Page 1-5 of the C Compiler manual. However, this is only partially correct. It is true that character values are stored *in memory* as an 8-bit signed value, but they are sign-extended into a 16-bit signed value in the 6809's registers. For example, assume you've written a program that uses the following C source fragment:

```
char c;
int i;
c = 0x80;
i = c;
```

The assembly source produced by the compiler is as follows:

```
ldd  #$80
stb  c,y
ldb  c,y
```

EVERYONE'S TALKING ABOUT...

DUAL HI-RES JOYSTICK ADAPTER
Colorware Hi-Res Tandy Hi + Low Res, cassette jack $40

HI & LO-RES JOYSTICK ADAPTER
Tandy Hi + Lo-Res $27

HAWKSoft keyboard cable $25
DOMINATION war game $18
MYDOS extended DOS for you! $15

HAWKSoft
P.O. Box 7112 Elgin, Il 60121
(708) 742-3084 eves and ends
SASE for more info and price list.
S/H (US & CAN) always included
M.O. Check C.O.D. no credit cards
1 year warranty on ALL hardware !!

• AWARDS, CERITIFICATES, DIPLOMAS
• SIGNS, BANNERS, GREETING CARDS
• LABELS WITH TEXT & PICTURES...

Graphics As Easy As 1 2 3

You don't have to be an artist to create fabulous looking printouts on your CoCo. Zebra's three graphics software products all contain clip-art collections and each program is optimized for special types of printed items.

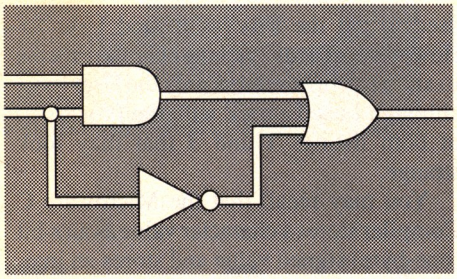
1 First Prize comes with 9 disks of clip art, borders, and templates to make awards, certificates, diplomas, and licenses for business, education, family, general purpose, humor, religion and sports $49.95

2 CoCo Graphics Designer Plus, comes complete with Border, Font, and Picture collections to make great signs, banners, and greeting cards.....$29.95

3 Label Designer comes with picture and font collections and makes great labels with text and graphics. The program's features include automatic serial numbering, mail merge, and auto disk directories $29.95

All products require 64K CoCo II or 3, mouse or joystick, disk drive, and compatible printer. Please specify printer when ordering.
Include $3 S&H. Plus $3.50 if UPS COD. VISA/MC Accepted.

ZEBRA SYSTEMS, INC.
121 S. Burrowes St., State College, PA 16801
(814) 237-2652



```
sex
std  i,y
```

This is fine if you are working with 8-bit signed values, but it leads to the side effect of creating 16-bit signed values when converting from a character to an integer, which is desired in most cases. If you are using the 8-bit signed value $80 (-128), this is translated to the 16-bit signed value $FF80 (-128). But in this case you want to use 8-bit unsigned values, which aren't supported by the Microware C Compiler. The C compiler does support 16-bit unsigned values, so you might use the following C source fragment:

```
char c;
unsigned i;
c = 0x80;
i = (unsigned) c;
```

This results in the following assembly-language source code:

```
ldd  #$80
stb  c,y
ldb  c,y
sex
std  i,y
```

The problem in this case is that c starts with a value of $80 (-128) and i results in an unsigned value of $FF80 (+65408), which is far from what you want.

However, you can trick the compiler into converting an 8-bit signed value into an 8-bit unsigned value while it is in a register. This allows you to store the unsigned representation of the 8-bit value into a 16-bit variable. For example, assume you are using the following C source fragment:

```
char c;
int i;
c = 0x80;
i = (int) (c & 0xFF);
```

The assembly source produced is

```
ldd  #$80
stb  c,y
ldb  c,y
sex
clra
std  i,y
```

In this case, c starts with a value of $80 (-128) as usual and is sign-extended into the 16-bit signed value $FF80 (-128). However, the upper byte is masked immediately after the sign extension, leaving us with the 16-bit signed value of $0080 (+128). This technique is used in listings 1 and 3 to ensure the functions return a positive 16-bit Process ID. However, be aware that this trick is specific to the Microware C Compiler and may not work properly with other C compilers. Perhaps a better solution is to use the `abs()` function to obtain the absolute value, as seen in the following example:

```
char c;
int i;
c = 0x80;
i = abs(c);
```

Most of the user-mode system calls are already included in the standard library so you won't have to worry about those. But the newer system calls, such as `F$GBlkMp`, `F$GModDr`, `F$GPrDsc`, `F$NMLink` and `F$NMLoad`, are very handy to have available in a library. The `F$GBlkMp` system call is used to get a copy of the system block map. Now that sounds really useful, eh? The manual doesn't make this point very clear, but the system block map contains one byte for each block supported by the memory management unit or, in the case of the CoCo 3, the DAT in the GIME chip. The number of blocks available depends on the amount of memory installed in the system, but you should use a 1024-byte buffer to store the data just to play it safe. Remember that the CoCo 3 uses 8K blocks (8192 bytes each) so the most common number of blocks you will encounter are 16 (128K), 32 (256K), 64 (512K) and 128 (1024K).

Upon returning from the `F$GBlkMp` system call, Register D contains the size of each block and Register Y contains the number of blocks. On a 512K CoCo 3, Register D is $2000 (8192 bytes-per-block) and Register Y is $40 (64 blocks). Each byte in the buffer represents one block and is encoded as follows:

Bit 7: 0=RAM, 1=Not RAM
Bit 1: 0=Data, 1=Module
Bit 0: 0=Free, 1=In use

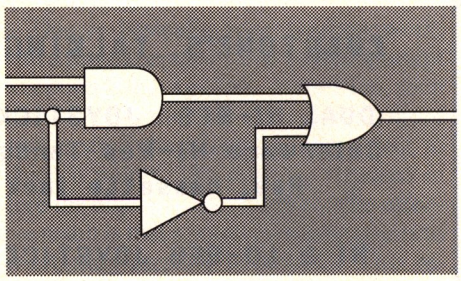
The typical values you will see are

$00: Free block
$01: Block contains data
$03: Block contains a module

An example of how to write the `GBlkMp()` function is shown in Listing 5. Note that the status returned from the `_os9()` function is returned to the calling function. This is very important — it allows the calling function to handle errors as they occur.

The `F$GModDr` system call is used to get a copy of the module directory. With this system call, you need to allocate a 2048-byte block of memory in which to store the module directory. The structure of each entry in the module directory is shown in Figure 1. However, there is a little trick you must use to determine the number of entries that are actually used. Remember, you are working with a 2048-byte block that is theoretically capable of storing 256 entries — each entry uses eight bytes and 2048/8 is 256. Also remember that you call the `F$GModDr` system call with the address of the buffer in Register X, and it returns with the ending address of the buffer in Register Y. Subtracting Register X from Register Y (`reg.rg_y-reg.rg_x`) gives the number of bytes actually used. Dividing the result by eight gives the number of entries used.

The `F$GModDr` system call also returns the starting address of the module directory within the system map. Although the manuals never explain why this address is returned or what it is used for, it is extremely important as you shall see. Now examine the source in Listing 6. As usual, the `registers` structure is declared and the `_os9()` function is used to perform the system call. The value returned by `_os9()` is assigned to `status` for later use. Four pointers are also declared: One points to the buffer to store the module directory, and three are used to return the values returned from the `F$GModDr` system call.



A sample program that calls the `GModDr()` function is shown in Listing 7. As you may quickly determine, not much information is contained within the module directory — not even the module names are there. To obtain the information contained in the module header, you need to use the `F$CpyMem` system call shown in Listing 8. Even though `F$CpyMem` appears very easy to use, there are a few hidden tricks that aren't documented in the manuals. It appears that you should be able to pass the DAT Image pointer, the offset of the block and the byte count straight through to `F$CpyMem`, but this isn't the case.

Remember I previously mentioned that the 2048-byte buffer is *theoretically* capable

Listing 1: Get_ID.c

```
#include <os9.h>

Get_ID(Proc_ID, User_ID)
int *Proc_ID;
int *User_ID;
{
     struct registers reg;

     _os9(F_ID, &reg);
     *Proc_ID = (int) (reg.rg_a & ØxFF);
     *User_ID = reg.rg_y;
}
```

Listing 2: test_Get_ID.c

```
main()
{
     int Proc_ID;
     int User_ID;

     Get_ID(&Proc_ID, &User_ID);
     printf("Process ID = %d\n", Proc_ID);
     printf("   User ID = %d\n", User_ID);
}
```

Listing 3: getpid.c

```
#include <os9.h>

int getpid()
{
     struct registers reg;

     _os9(F_ID, &reg);
     return((int) (reg.rg_a & ØxFF));
}
```

Listing 4: getuid.c

```
#include <os9.h>

int getuid()
{
     struct registers reg;

     _os9(F_ID, &reg);
     return(reg.rg_y);
}
```

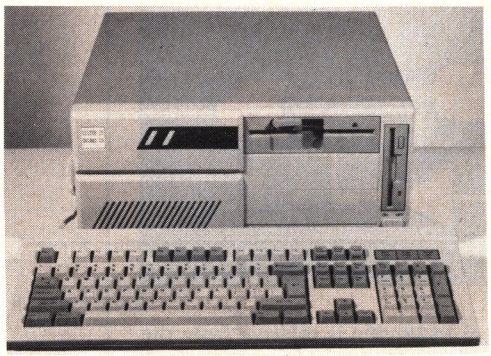
Listing 5: GBlkMp.c

```
#include <os9.h>

GBlkMp(block)
char *block;
{
     struct registers reg;

     reg.rg_x = block;
     return(_os9(F_GBLKMP, &reg));
}
```


SYSTEM IV



THE BEST OF THREE WORLDS

1 - A Multi-User Multi-Tasking System
2 - Optional Plug-in Board for MS-DOS
3 - Optional Emulator/Interpreter for OS-9/6809 Software

SYSTEM IV - The 68000 Computer *already* serving customers here and abroad!

- Expandable using readily available low-cost cards
- Flexible enough to tailor to your requirements
- Versatile enough to use OS-9/68000, OS-9/6809 and MS-DOS applications
- Powerful - outperforms other machines in its' price class

Just call, FAX, or drop us a line. We will respond promptly with complete pricing and specifications.

DELMAR CO - the Company that's been serving its' customers since 1975.

Terminal Systems ..... from $ 999.00
Console Systems ..... from $1,149.00

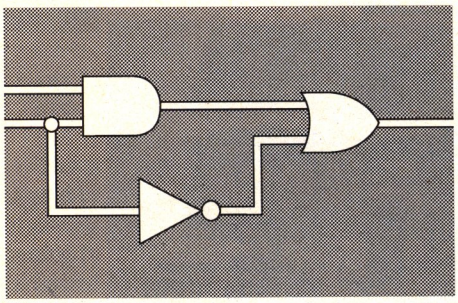
Assembled boards and kits available

RAINBOW CERTIFICATION SEAL

delmar co

Middletown Shopping Center - PO Box 78 - Middletown, DE 19709
302-378-2555 FAX 302-378-2556

of holding 256 entries? Theoretically is the key word here because a subset of the DAT images is located at the end of this buffer. Another point not mentioned is that the F$CpyMem system call uses the DAT images located in your workspace. This creates a problem in that the DAT Image pointer re-



turned from F$GModDr is relative from the system map, meaning that you need to find the offset to the DAT Image within your workspace. The first step is to find the base address of the DAT Image relative to the start of the module directory. Since the F$GModDr system call returns the address of the module directory in the system map, you can use it to find the base address. For example, assume the DAT Image is located at $0FFE and the address of the module directory is $0A00 (both of these addresses are relative to the system map). By subtracting $0A00 from $0FFE, you know that the DAT Image is located $05FE bytes from the start of the module directory. The final part of the formula is to find the absolute address of the DAT Image in your workspace. You can do this by adding the address of the module directory in your workspace to the result of the previous calculation.

Now that you know how to deal with the DAT Image pointer, you can focus on the module header. The basic module header, which contains most of the information you need, is nine bytes in size and the format is shown in Figure 2. Note that you do not know where the module name is located within the module. You could copy a lot of extra data in the hopes of finding the module name immediately following the module header. However, the module name can appear anywhere within the module — especially in device descriptors where the module name is usually at the end. Since you know the offset of the module within the block, you can use the module name offset located in the module header to locate the module name. To do this, add the offset of the module to the offset of the module name (mod_dir.Offset + mod_hdr.Name_Offset) and use a length of at least 32 bytes — the maximum length of a module name.

Listing 9 shows the final source code for

Listing 6: GModDr.c

```
#include <os9.h>

GModDr(buffer, buf_start, buf_end, sys_start)
char *buffer;
unsigned *buf_start;
unsigned *buf_end;
unsigned *sys_start;
{
     struct registers reg;
     int status;

     reg.rg_x = buffer;
     status = _os9(F_GMODDR, &reg);
     *buf_start = reg.rg_x;
     *buf_end   = reg.rg_y;
     *sys_start = reg.rg_u;
     return(status);
}
```

Listing 7: test_GModDr.c

```
#include "moddir.h"

main()
{
     MOD_DIR mod_dir[256];
     int entries;
     int buf_start;
     int buf_end;
     int sys_start;
     int i;

     if((GModDr(mod_dir, &buf_start, &buf_end, &sys_start)) == -1)
          exit(errno);

     entries = (buf_end - buf_start) / 8;

     for(i = 0; i < entries; i++)
     {
          printf("DAT Image Pointer = %04X\n", mod_dir[i].DAT_Image);
          printf("Memory Block Size = %04X\n", mod_dir[i].Block_Size);
          printf("Offset of Module  = %04X\n", mod_dir[i].Block_Offset);
          printf("Module Link Count = %04X\n", mod_dir[i].Link_Count);
          printf("\n");
     }
}
```

Listing 8: CpyMem.c

```
#include <os9.h>

CpyMem(dat_image, offset, count, buffer)
unsigned dat_image;
unsigned offset;
unsigned count;
char *buffer;
{
     struct registers reg;

     reg.rg_a = (char) ((dat_image >> 8) & 0xFF);
     reg.rg_b = (char) (dat_image & 0xFF);
     reg.rg_x = offset;
     reg.rg_y = count;
     reg.rg_u = buffer;
     return(_os9(F_CPYMEM, &reg));
}
```

a program that prints an unformatted module directory listing. As documented above, the first step is to copy the module directory into your workspace using the F$GModDr system call. You may quickly notice that the variables mod_dir and buf_start are pretty much the same thing — mod_dir is an array of structures of type MOD_DIR and buf_start is an unsigned integer that contains the address of the first element in mod_dir. I used buf_start so I wouldn't have to use pointer arithmetic with mod_dir. I prefer to avoid performing calculations with pointers where possible. ❑

Listing 9: moddir.c

```
#include "moddir.h"
#include "modhdr.h"

main()
{
     MOD_DIR   mod_dir[256];
     MOD_HDR   mod_hdr;
     unsigned  buf_start;
     unsigned  buf_end;
     unsigned  sys_start;
     unsigned  image;
     unsigned  offset;
     char      mod_name[32];
     char      string[32];
     int       entries;
     int       i;

     if((GModDr(mod_dir, &buf_start, &buf_end, &sys_start)) == -1)
          exit(errno);

     entries = (buf_end - buf_start) / 8;

     for(i = 0; i < entries; i++)
     {
          image = mod_dir[i].DAT_Image - sys_start + buf_start;
          CpyMem(image, mod_dir[i].Block_Offset, sizeof(MOD_HDR), &mod_hdr);

          offset = mod_dir[i].Block_Offset + mod_hdr.Name_Offset;
          CpyMem(image, offset, 32, string);

          strhcpy(mod_name, string);
          printf("%s\n", mod_name);
     }
}
```

CORRECTIONS

"Pyramid"(May 1991, Page 78): A little bug crept in that may cause the computer to "hang" under certain conditions. To correct the problem, change POKE 400,180 in Line 2 to POKE 140,180. In Line 65, change POKE 400,20 to POKE 140,20 and POKE 400,180 to POKE 140,180. The corrected lines should appear as follows:

```
2 CLEAR1000:RGB:HBUFF1,810:HBUFF
2,810:HBUFF3,810:HBUFF4,810:HBUF
F5,810:SH=1:POKE140,180:EXEC4335
0:POKE&HF80F,0:POKE&HF84F,0:POKE
&HF89C,0:PALETTE0,63:PALETTE1,60
:PALETTE2,0:PALETTE3,36:DIMN$(13
),X(29),F(29),Y(29),CA(52)

65 POKE65496,.:POKE140,20:FORD=1
TO10:EXEC:NEXT:POKE65497,.:POKE1
40,180:RETURN
```

"Graphic Experiments"(March 1991, Page 78): In the third paragraph, NE40 in the HCIRCLE statement should be NU40. In the fourth paragraph, lines 310 and 320 should be lines 200 and 210. And in the sixth paragraph, "angle from 0-90 degrees" should read "angles from 0-88 degrees."

"Turbo Light"(May 1991, Page 53): The headings in the third column for the power connections are reversed. The figure should read:

IC	Ground	+5 Volts
U1	8	16
U2	7	14

Send for FREE CATALOG

Turn your Tomcat™ into a TIGER!

The power of the 68000, even from BASIC!

The TIGER is a 68000 co-processor for the TOMCAT TC9 that runs at the blistering speed of 10 Mhz! That's over 5 times faster than the CoCo3! Some functions can be speeded up by as much as 8 times with the TIGER!

Now use all your existing RSDOS software and hardware AND have the power of the 68000 in the same cabinet. Amaze your friends with the speedup possible with the TIGER. If and when you want you can add OS9/Level II and speed that up by a factor of 2 or 3! You could also add OS9/68000 to the TIGER without sacrificing ANY of your existing software OR hardware. OS9/68000 runs on the TIGER with your drives etc. that are running from your TOMCAT TC9! NO extra hardware needed. Later, if you want, you can further improve the performance of the TIGER by adding modules (cards) to the TIGER on the K-Bus! Already there are more than 20 different cards available including memory cards, 2 and 4 port serial cards, 4 port parallel cards, SCSI and floppy controller cards, DMA (Direct Memory Access) cards, and more! With the TIGER you can use these cards even from BASIC! Just 'CALL THE TIGER'

$129.95

You don't have to spend THOUSANDS to have the power of the 68000! As a matter of fact the TIGER introductory price is ONLY $129.95!

That's right! ONLY $129.95!

Now with the TIGER, FHL, long the leader in Color Computer hardware and software, brings the power of the 68000 within reach of Color Computer users without requiring that you abandon your existing hardware OR software. AND you get the ability to run ALL the software that will be available someday for the more expensive OS9/68000 computers.

So, why spend THOUSANDS today for a computer with little software when for JUST $129.95 you can have the SAME power, run the SAME software, for one TENTH the cost!

The TIGER is in stock for immediate delivery!

Call today for our complete catalog and newsletter with more information on the TIGER and the TOMCAT TC9, It's FREE!

* The TIGER requires the TOMCAT TC9 to run.

ORDERING INFORMATION

VISA and M/C, check and C.O.D. Contential U.S. software shipping add $5.00 Ground - $8.00 Two Day Air. Hardware add $15 ground - $27 Two Day Air. Please call for Next Day Air costs and C.O.D. Foreign add 10% Shipping (Minimum $5 USD). NY residents please add 7% sales tax.

FRANK HOGG LABORATORY

Since 1976
204 Windemere Road
Syracuse, NY 13205
FAX 315/469-8537

Call 315/469-7364

Novices Niche

Text & Graphics

by Keiran Kenny

With PIXTEXT4, you can place text directly on a PMODE4 screen. The strings for the mini-font graphics characters are defined in lines 460-510. The string for each character is labeled L$, and its ASCII number appears in parentheses.

Most of the characters are drawn in a frame that is four pixels high by three pixels wide. A few, like X and Y, are drawn in a 4-by-4 frame. Because of their small size, the characters are necessarily somewhat primitive, but they are quite readable. You can get about 40 characters per graphics screen line.

You can preload the binary PMODE4 image or run a BASIC program that draws a PMODE4 picture on the screen. (Press BREAK once the image is drawn.) Run PIXTEXT4 and answer Y to the query that asks if your picture is in memory. Otherwise, if your picture file is saved in binary format and has not been previously loaded, answer N to the query and follow the next prompt to enter the filename. If it is a disk file with an extension other than .BIN, include the extension in the filename.

Enter the scale as a multiple of 4 (4, 8, 12, etc.) at which you want the characters drawn on the screen. Do not use intermediate scales — these can distort the characters and may result in an FC error.

Your picture appears on the screen with a flashing cursor in the upper-left corner of the screen. Use the arrow keys to position the cursor. Press ENTER and type your first line of text. When you have entered enough text in this line and want to continue entering in the same scale, press CLEAR. The cursor appears one line down, at the left. In other cases press ENTER, which takes you to the menu.

Press 2 for Replay and enter another scale at the prompt. On the graphics screen, move your cursor as before. The cursor moves in steps adjusted to the predetermined scale.

When entering text, use the left arrow to backspace and delete errors. If you position the cursor at the beginning of an existing line, you can use the right arrow to delete from left to right. The deletion rectangle in Line 320 adjusts to suit the scale you are using.

Do not place text too close to elements in the graphics image or when you press the left arrow to backspace, you may erase part of the picture. However, you can move the cursor through existing text or figures without any damage.

After you have typed the last line of text, press ENTER. At the menu, you can save your picture as a binary file, add or change text, load another picture, or end the program.

If you have a disk drive connected, the image is saved to disk. Line 20 sets the value PX=1 if you use a disk drive. If you do not have a disk drive, the file is saved to tape.

The high-speed poke is in effect throughout the program, except when loading or saving files. Line 30 sets the variables SP and SL according to whether you are using a CoCo 2 or a CoCo 3.

The Listing: PIXTEXT4

```
0 'PIXTEXT4
1 'WRITTEN BY KEIRAN KENNY
2 'COPYRIGHT (C) AUGUST 1991
3 'BY FALSOFT, INC.
4 'RAINBOW MAGAZINE
10 CLS:CLEAR500
20 IFPEEK(&H15F)=196THENPX=1
30 IFPEEK(&HFFFE)*256+PEEK(&HFFF
F)=&H8C1B THENSP=65497:SL=65496E
LSESP=65495:SL=65494
40 GOTO450
50 PMODE4,1:COLOR0,1
60 PRINT@224,"IS PICTURE IN MEMO
RY? Y/N"
70 K$=INKEY$:IFK$<>"Y"ANDK$<>"N"
THEN70
80 IFK$="Y"THEN110
90 CLS:PRINT@224,"LOAD PIXNAME:"
;:LINEINPUTPX$:IFPX THENLOADMPX$
:GOTO110
100 CLOADMPX$
110 POKESP,0
120 INPUT"ENTER SCALE:";SC:IFSC<
8THENSC=4
130 SCREEN1,1
140 H=0:V=7*SC/4
150 IFINKEY$=CHR$(13)THEN280
160 IFPEEK(341)=247THENV=V-8*SC/
4
170 IFPEEK(342)=247THENV=V+8*SC/
4
180 IFPEEK(343)=247THENH=H-6*SC/
4
190 IFPEEK(344)=247THENH=H+6*SC/
4
200 IFV<7*SC/4THENV=7*SC/4
210 IFV>191THENV=191
220 IFH<0THENH=0
230 IFH>249THENH=249
240 DR=PPOINT(H,V)
250 IFDR=0THENPSET(H,V,1)ELSEPSE
T(H,V)
260 FORDL=1TO200:NEXT:PSET(H,V,D
R)
270 GOTO150
280 X=H:Y=V
290 BT=X
300 K$=INKEY$:IFK$=""THEN300
310 IFK$=CHR$(12)THENH=0:V=Y+8*S
C/4:GOTO150
320 IFK$=CHR$(9)THENCOLOR5:LINE(
X,Y+2)-(X+5*(SC/4),Y-6*(SC/4)),P
SET,BF:X=X+6*(SC/4):COLOR0:GOTO3
00
330 IFX>248ANDK$<>CHR$(8)ANDK$<>
CHR$(12)ANDK$<>CHR$(13)THEN300
340 IFX=BT ANDK$=CHR$(8)THEN300E
LSEIFK$=CHR$(8)THEN350ELSEIFK$=C
HR$(13)THEN370ELSE360
350 COLOR5:LINE(X-6*(SC/4),Y-6*S
C/4)-(X,Y+2),PSET,BF:X=X-6*SC/4:
COLOR0:GOTO300
360 COLOR0:DRAW"S=SC;BM"+STR$(X)
+","+STR$(Y)+L$(ASC(K$)):X=X+6*S
C/4:GOTO300
370 CLS:POKESL,0:PRINT@131,"1. S
AVE PIX",,TAB(3)"2. REPLAY",,TAB
(3)"3. LOAD ANOTHER",TAB(3)"4. E
ND":PRINT:PRINTTAB(6)"PRESS 1 -
4)"
380 K$=INKEY$:IFK$<"1"ORK$>"4"TH
EN380
390 ONVAL(K$) GOTO400,110,90,440
400 CLS:PRINT@224,"SAVE PIXNAME:
";:LINEINPUTPX$
410 IFPX THENSAVEMPX$,3584,9727,
40999:GOTO430
420 CSAVEMPX$,1536,7679,40999
430 GOTO370
440 CLS:END
450 DIMA(32),B(110),L$(90)
460 L$(48)="U4R3D4NL3":L$(49)="R
```

```
2LU4NGBRBD4":L$(50)="BU4R3D2L3D2
R3":L$(51)="R3U2NL2U2NL3BD4":L$(
52)="BUNU3R2NUNDRBD":L$(53)="R3U
2L3U2R3BD4":L$(54)="NR3U4D2R3D2"
:L$(55)="BU4R3DG3BR3":L$(56)="BR
HEHERFGNLFGNLBR":L$(57)="BR3U4L3
D2R3D2"
470 L$(65)="U3ERFDNL3D2":L$(66)=
"U4R2FGNL2FGNL2BR":L$(67)="BRHU2
ERFBD2GNLBR":L$(68)="U4R2FD2GNL2
BR":L$(69)="NR3U2NR2U2R3BD4":L$(
70)="U2NR2U2R3BD4":L$(71)="BRHU2
ER3BD2NLDGNL2BR":L$(72)="U4BR3D2
NL3D2":L$(73)="R2LU4NLRBD4":L$(7
4)="BRNHREU3BD4"
480 L$(75)="U4D2RNE2F2":L$(76)="
NU4R3":L$(77)="U4FRED4":L$(78)="
U4F3U3D4":L$(79)="BRHU2ERFD2GNLB
R":L$(80)="U4R2FGNL2BRBD2":L$(81
)="BRHU2ER2FDG2ENFGNL2BR2":L$(82
)="U4R2FGL2RF2":L$(83)="R2EHLHER
2BD4":L$(84)="BR2U4NL2R2BD4":L$(
85)="BRHU3BR4D3GNL2BR"
490 L$(86)="BR2H2U2BR4D2NG2BD2":
L$(87)="NU4ERFNU4":L$(88)="E4BL4
F4":L$(89)="BR2U2NH2E2BD4":L$(90
)="NR4E4L4BF4"
500 L$(33)="UBU2NU2BD2":L$(36)="
R3EHL2HER3L2NUD5UBR2":L$(37)="NE
4BU3UBR4BD3D":L$(39)="BU3UBD4":L
$(40)="BRHU2EBD4":L$(41)="EU2HBR
BD4":L$(42)="BR2U2NG2NL2NH2NU2NE
2NR2F2":L$(43)="BR2U4D2NL2R2BD2"
:L$(44)="NGNU":L$(45)="BU2R4BD2"
510 L$(46)="NU":L$(47)="E4BD4":L
$(58)="UBU2UBD4":L$(59)="NGUBU2U
BD4":L$(61)="BUNR4BU2R4BD3":L$(6
3)="NRBU2R3U2L3BD4BR3"
520 GOTO50
```

Screen Utility CoCo 3

Palette Control

by Chuck Katsekes

Palette 40/80 allows you to change the foreground and background colors of the CoCo 3's 40- or 80-column screen to any of the 64 available colors. This program is a supplement to *Palette 32* (THE RAINBOW, May 1988), which changed the foreground and background colors of the 32-column screen on the CoCo 3.

When you run the program, you are asked if you want to change the colors of the 40- or 80-column screen. Press 1 for the 40-column screen or 2 for the 80-column screen. The `WIDTH` command is used to display the selected screen. You are prompted to enter the color values for the foreground and background palette slots. The selected colors are then set into Palette 0 (the background) and Palette 8 (the foreground).

The Listing: `PAL40-80`

```
10 'PALETTE 40/80
20 'WRITTEN BY CHUCK KATSEKES
25 'COPYRIGHT 1991 FALSOFT,INC.
30 ' THIS UTILITY SUPPLEMENTS PA
L32.BAS AND ALLOWS YOU TO
40 ' CHANGE THE FORGROUND AND BA
CKGROUND COLORS FOR 40/80
45 ' COLUMN SCREENS ON THE COCO
3
50 CLS1:WIDTH 40
60 LOCATE3,2:PRINT"40/80 COLUMN
PALETTE UTILITY"
70 PRINT:INPUT"<<ENTER SCREEN WI
DTH 1=40 2=80>>";Q$
80 IF Q$="1" THEN100
90 IF Q$="2"THEN110
100 CLS1:GOTO120
110 CLS1:WIDTH80:GOTO120
120 PRINT:PRINT"X=BACKGROUND   Y
=FOREGROUND"
130 PRINT"<0-63>          <0-63>
"
140 FOR X=0 TO 63
150 FOR Y=0 TO 63
160 PRINT:PRINT"X =";:INPUT X
170 PRINT:PRINT"Y =";:INPUT Y
180 CLS1:PALETTE0,X:PALETTE8,Y
190 END
```

Screen Utility 32K Extended

Text-Screen Dump

by Joel Hegberg

TextDump is a useful utility that allows you to dump 32-, 40- and 80-column screens to your printer from BASIC any time you need a hardcopy of the text on the current screen. This utility can be used while a program is running.

Enter the program as listed, then save it to tape or disk *before* running it. *TextDump* not only informs you of any errors you make while entering the `DATA` statements, it tells you exactly in which line the error was made. Remember to save the program after you correct any errors.

Once the program runs perfectly, you are ready to print text screens. *TextDump* multitasks with BASIC's interrupts so you won't even know it's there. If your printer is set to a baud other than 600, you must change the computer's baud before printing. To print a screen, simply press CTRL-F1. *TextDump* automatically places your system into slow mode and prints the current screen. When printing is completed, *TextDump* returns control to BASIC.

TextDump works with any Color Computer that has at least 32K and the newer keyboard (with the control and function keys). This program is reset-protected, which means you can press the Reset button in the back of the CoCo and not have to worry about your system crashing. One last note: *TextDump* can be used with Microcom Software's *512K BASIC*. Simply run *TextDump* before you run the *512K BASIC* boot file.

The Listing: `TEXTDUMP`

```
1 'TEXTDUMP
2 'BY JOEL MATHEW HEGBERG
3 'COPIRIGHT (C) AUGUST 1991
4 'BY FALSOFT, INC.
5 'RAINBOW MAGAZINE
10 'TEXTDUMP
20 'CREATED JANUARY 23, 1989
30 'BY JOEL MATHEW HEGBERG
40 '936 NORTH TWELFTH STREET
50 'DE KALB, ILLINOIS  60115
```

```
60 '
70 'DEDICATED TO MY GOOD
80 'FRIEND, DAVE.
90 '
100 CLEAR500,32400:RESTORE:CLS:I
FPEEK(269)*256+PEEK(270)=32401TH
ENPRINT"TEXTDUMP ALREADY INSTALL
ED.":NEW
110 TL=0:LT=0:LN=250:T=32401
120 READA$
130 IFA$="**"THEN190
140 A=VAL("&H"+A$):IFLEN(A$)=3TH
EN170
150 TL=TL+A:LT=LT+A:POKET,A
160 T=T+1:GOTO120
170 IFLT<>A THEN PRINT"ERROR IN
LINE #";LN:STOP
180 LN=LN+10:LT=0:GOTO120
190 READA$:A=VAL("&H"+A$)
200 IFA<>TL THEN PRINT"ERROR IN
DATA STATEMENTS.":STOP
210 A$=CHR$(142)+CHR$(126)+CHR$(
145)+CHR$(191)
220 A$=A$+CHR$(1)+CHR$(13)+"9":A
=VARPTR(A$):POKE32730,PEEK(269)
230 POKE32731,PEEK(270):EXEC(PEE
K(A+2)*256+PEEK(A+3))
240 CLS:PRINT"TEXTDUMP IS INSTAL
LED.":END
250 DATA 34,76,B6,1,57,81,BF,10,
27,0,6,35,76,6E,9F,7F,DA,B6,6FC
260 DATA 1,56,81,BF,10,27,0,6,16
,FF,EE,60,0,86,86,FE,D6,6F,F7,87
D
270 DATA 7E,AE,97,6F,B7,FF,D8,B7
,FF,D6,86,D,AD,9F,A0,2,96,E7,B4A
280 DATA 81,1,10,24,0,6D,8E,4,0,
5F,A6,84,B7,7E,AF,86,AF,A7,84,78
2
290 DATA B6,7E,AF,81,80,10,24,0,
48,81,1F,10,23,0,47,81,60,10,56B
300 DATA 24,0,46,1A,50,AD,9F,A0,
2,B6,7E,AF,A7,80,CB,1,C1,20,779
310 DATA 10,25,0,15,5F,A6,82,B7,
7E,AF,86,AF,A7,84,86,D,AD,9F,7F4
320 DATA A0,2,B6,7E,AF,A7,80,8C,
5,FF,10,23,FF,B3,F6,7E,AE,D7,A1A
330 DATA 6F,86,FF,B7,1,57,16,FF,
70,86,20,16,FF,BF,8B,60,16,FF,90
2
340 DATA BA,80,40,16,FF,B5,8E,40
,0,5F,1A,50,86,76,B7,FF,A2,A6,8D
5
350 DATA 84,B7,7E,AF,A6,1,B7,7E,
B0,86,20,A7,84,86,C0,A7,1,B6,969
360 DATA 7E,AF,AD,9F,A0,2,B6,7E,
AF,A7,80,B6,7E,B0,A7,80,CB,1,9FC
370 DATA 96,E7,81,1,10,27,0,1D,C
1,50,10,25,0,D,5F,17,0,3F,86,4E1
380 DATA D,AD,9F,A0,2,17,0,49,8C
,4E,FF,10,23,FF,B2,16,0,1A,C1,70
9
390 DATA 28,10,25,0,D,5F,17,0,22
,86,D,AD,9F,A0,2,17,0,2C,8C,452
400 DATA 47,7F,10,23,FF,95,F6,7E
,AE,D7,6F,86,7A,B7,FF,A2,86,9D3
410 DATA FF,B7,1,57,16,FE,E0,A6,
83,B7,7E,AF,A6,1,B7,7E,B0,86,A21
420 DATA 20,A7,84,86,C0,A7,1,39,
B6,7E,AF,A7,80,B6,7E,B0,A7,80,98
7
430 DATA 39,**,9463
```

Financial Help 16K Extended

Tax Tables

by Charles Gibson

If you have to collect sales tax, you'll find *Tax Table* to be a real help. This program prints a six-column sales-tax chart for the percentage rate you choose. It is designed for use on a CoCo 2 or 3 with a DMP-105 printer set at 2400 baud, but it can be modified to suit your system.

The codes in Line 170 are for condensed print at 3/4-line feed. The baud is set in Line 50 and may be changed for your printer or omitted for 600 baud. The high-speed poke in Line 80 and the normal-speed poke in Line 150 are for the CoCo 3. They can be omitted or you can change them to 65495,0 and 65494,0, respectively, for the CoCo 2. Note that if you press BREAK while the program is counting, the computer is left in the high-speed mode.

The counter may count to 700 or 800, depending on the rate you choose. This process takes two or three minutes, and when it stops, printing begins. Be sure the printer is set as close to the top of the page as possible. A full printout should fill a page, skip the perforation, and use about half the next page, depending on the percentage rate. You may press BREAK at the perforation if you do not want the second page.

No responsibility for tax collection is assumed. The figures depend on how the computer rounds off amounts and may have an occasional penny difference. But these printed charts compare favorably to the printed charts given out in my area.

When you are finished, you may take a red pencil and draw a line behind the row of stars in each column. This causes them to stand out and makes them easier to read. Then fold and place the sheets in a plastic protector so you can flip it over for the second page, if that is required for your tax table. If you need a second copy, advance the page to the next sheet, type GOTO 140 and press ENTER.

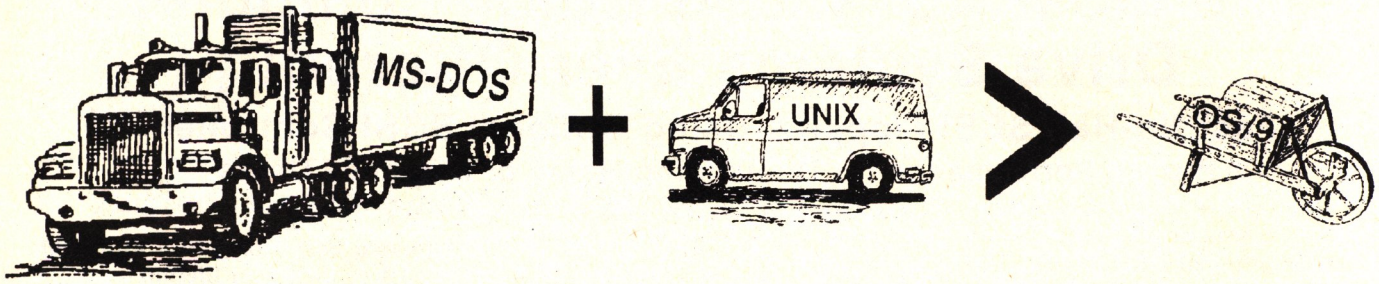
The Listing: TAXTABLE

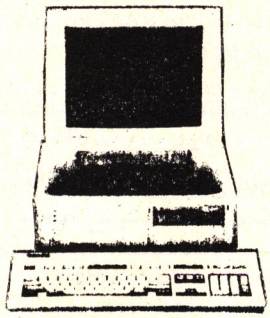
```
1 'TAX TABLE
2 'WRITTEN BY CHARLES GIBSON
3 'COPYRIGHT (C) MARCH 1991
4 'BY FALSOFT, INC.
5 'RAINBOW MAGAZINE
10 'TAXTABLE-WRITTEN BY CHARLES
LEE GIBSON-701 SHERMAN-EDWARDSVI
LLE,IL 62025
20 CLS:CLEAR
30 G=.01:K=.004:L=.01
40 DIMB(1000):DIMC(1000):DIMD(10
00)
50 POKE150,18:'BAUD RATE 2400
60 INPUT"ENTER RATE (.03 FOR 3%)
";H
70 PRINT"  INITIALIZING- PLEASE
WAIT":PRINT"  ABOUT TWO MINUTES"
:PRINT"  AT HIGH SPEED":PRINT"
BE SURE PRINTER IS ON LINE"
80 POKE 65497,0
90 J=G*H
100 IFJ=>K THEN GOTO 120
110 G=G+.01:GOTO90
120 A=A+1:PRINT@174,A:IFG>101 TH
EN GOTO 140
130 B(A)=L:C(A)=G:D(A)=J:L=G+.01
:K=K+.01:GOTO110
140 E=0:F=80:M=160:N=240:O=320:P
=400
150 POKE 65496,0
160 PRINT#-2,"   TAX TABLE AT- "
;H*100;"%"
170 PRINT#-2, CHR$(27);CHR$(20);
CHR$(27);CHR$(56);
180 E=E+1:F=F+1:M=M+1:N=N+1:O=O+
1:P=P+1
190 IF P=481 THEN GOSUB 240
200 IF E=531 THEN GOTO 230
210 PRINT#-2,USING"###.##";B(E);
C(E);D(E);:PRINT#-2,"*";:PRINT#-
2,USING"####.##";B(F);C(F);D(F);
:PRINT#-2,"*";:PRINT#-2,USING"##
##.##";B(M);C(M);D(M);:PRINT#-2,
"*";:PRINT#-2,USING"####.##";B(N
);C(N);D(N);
220 PRINT#-2,"*";:PRINT#-2,USING
"####.##";B(O);C(O);D(O);:PRINT#
-2,"*";:PRINT#-2,USING"####.##";
B(P);C(P);D(P);:PRINT#-2,"*":GOT
O 180
230 PRINT#-2,CHR$(27);CHR$(19);C
HR$(27);CHR$(54):END
240 PRINT#-2:PRINT#-2:PRINT#-2:P
RINT#-2
250 E=481:F=531:M=581:N=631:O=68
1:P=731:RETURN
```

Would You Buy a Car You Couldn't Get Fuel For?

Why Buy a Computer You Can't Get Software For?

Many of you are now considering an alternative to the Color Computer to run OS/9. Are you really going to invest in an untried alternative with very limited software? Why not buy a computer that will run a UNIX Compatible (OS/9 like) operating system AND MS-DOS. According to published articles, this combination of industry-standard operating systems would run more than 90% of ALL of the software that has EVER been written. Compare the software bases represented below. We call these systems the OWL ATom.™ Can your alternative to the CoCo be fixed locally? On-site service is available most areas on the ATom.





These highly adaptable computers we call the **OWL ATom™** series. They are not newcomers to the computer world, but are the current versions of computers which we have been building for more than 6 years. All systems can be configured with your choice of hard drive, graphics monitor, and 6 different processors. The systems described here are typical of the new versions of our line which offer 2 industry-standard operating systems.

OWL ATom™ ET or SX

For general features of our OWL ATom including expansion capabilities, check out the table below. Comparisons are also given to several Tandy™ computers. The resolution of the optional VGA is also given.

Typical system components:
Processor: 80286-12 or 80386SX-16
Floppy drive: 1.2 or 1.44 Meg
Memory: 1MB
Hard Drive: 40 MB, 28 ms.
Monitor: TTL Monochrome (720X350)

MS-DOS Software:
MS-DOS (with all utilities)
GWBASIC
Integrated Software including:
Desktop Organizer with tracker
Outliner
Word Processor
Spelling Checker
Spreadsheet
Data Base
Graphics program
Communications

UNIX Compatible Software:
Coherent™ (A UNIX Compatible Operating System)
C Compilier
Full Screen Editor
Line Editor
Text Formattor
AWK Language and Yacc
Standard UNIX utilities

Documentation:
Over 1500 pages and VHS Tape

One of the best features is the price:

$1295/$1495

First year on-site service $45 (Most areas)
VGA Color (800X600X256 colors) $400.
Call 215-837-1917 for other options

FEATURES	OWL ATom	2500 XL*	1000 TL/2*
Processor (Speed)	80286(12)	80286(10)	80286(8)
Total Slots	8	3	4
16 Bit Slots	6	3	0
Standard Memory	1024K	1024K	640K
Max. on Board RAM	4096K	1024K	768K
Graphics Output	VGA	VGA	CGA
Max. Resolution	1024X768	640X480	640X200
Drive Slots	5	3	3
Hard Drive Interface	Yes(16 Bit)	Yes(16 Bit)	Yes(8 Bit)
Floppy Drive	1.2 or 1.44 Meg	1.44 Meg	720K
Power Supply (Watts)	200	70	67
Warranty (Parts and Labor)	1 Year	1 Year	1 Year

* Trademarks as follows: Model numbers -Tandy Corporation, MS-DOS- Microsoft, Inc.. OS/9 -MicroWare, Inc., UNIX- AT&T, Inc.

OWL-WARE
P.O. Box 116
Mertztown, PA 19539
Call to Order: (800)245-6228
PA and Support: (215)837-1917

Proven

On the Razor's Edge of

The New Frontier:

The Most Advanced Color Computer Drive Systems Ever Offered!

Fast No-Halt SCSI Floppies Using Optional SCSI Controller

Proven Performance for Demanding Home or Business Users

This is the most advanced, fully assembeled CoCo hard drive system offered. **Using the optional OMTI 5200 SCSI controller with our Hard Drive Interface, our new system will support no-halt floppy drives.** You need not wait while typing or worry about clock time losses. Why be limited to 3 floppy drives? A complete system could now consist of 1-3 standard CoCo floppy drives, 1-2 (or more) hard drives, and 1-3 no-halt floppies using standard (not just CoCo) OS/9 format. You can use single or double-sided 40 or 80 track drives with the SCSI no-halt controller.

There are several new features with this improved interface. These include:

- **Full SASI/SCSI compatible (this allows many add-ons to the versatile SCSI buss)**
- **No-Halt Floppies with optional SCSI controller allows full type-ahead during access**
- **Low factory-direct prices**
- **Fast Delivery from factory stock**
- **Optional Real Time Clock with built in battery (3-10 year lifetime)**
- **With the Clock you have 240 Bytes of battery backed up RAM for password protection or data storage!**
- **Same super stable LRTech quality**

Interface Price only: $85.

Real Time Clock-RAM: $25.

20 or 30 Meg. 40 Meg. 80 Meg.

System Prices: (Includes Hard Drive, case, & fan, SCSI Controller*, LR/OWL Interface, Software. Fully assembled and tested.)

$495. $535. $875.

Super System Prices: (LR/OWL System as above but OMTI 5200 SCSI Controller AND 3.5" or 5.5" HD 80 Track Floppy in same case)

$595. $645. $1039. (2 cases)

*SCSI controller is OMTI 5100. Add $75 for OMTI 5200 with FDC.

Introducing the *Quick-Link*™ Interface

Provides both a 64K Printer Buffer and Serial and Parallel Interfaces.

Serial to Parallel Printer Interface (64K Buffer) $65.

Converts serial computer output to parallel printer and also provides a 64K buffer in front of the printer. Serial side Female DB-25 and Parallel side is Centronics. Includes Centronics to Centronics cable and power AC-adapter. If you need an adapter from the CoCo 4-pin serial to DB-25 add $9. From 300-38,400 Baud.

Parallel to Serial Interface (64K Buffer) $45.

Same as above except it converts Centronics parallel computer output to DB-25 Female serial. Plug into an IBM printer cable to provide output to a serial plotter.

Parallel to Parallel (64K Buffer) $39.

This is parallel printer buffer with no conversion.

Drive System Parts

Hard Drives		
20/30 Meg	ST/PTI	$229.
40 Meg	PTI	265.
80 Meg	ST4096	590.
SCSI Controllers		
OMTI 5100	HD Only	$79.
OMTI 5200	HD/FD	169.
OMTI 5400	HD/FD/Tape	199.

(Note: We have no drivers for tape yet)

Cases and Cables	
Case, 45 Watt PS, Fan	$105.
Cable set (3 pieces)	25.

Drives have a 1-year limited warranty. Other parts are 90-day warranty. Please Note - At these prices, only very limited support can be given.

Technology

the Color Computer Frontier

DISK DRIVES

Floppy Drive Systems

The Highest Quality for Years of Service

Drive 0 Systems (Half Height, Double Sided, Direct Drives) **$189.**

Drive 0 systems complete with drive, controller, legal DOS, cable, case, power supply, and manual

Drive 1 Systems (Half Height, Double Sided, Direct Drives) **$115.**

New 3.5", 720K Drives for OS-9 with case & Power Supply **$149.**

Drive 1 Systems have drive, case, power supply. (You may require optional cable and/or DOS chip to use)

Special for 0/1 Combos (0,1,2,3) $259.

SALE Prices on Drives!

HALF- HEIGHT DRIVE UPGRADES FOR RS HORIZONTAL CASES

Why only double the capacity of your system when you can triple in the same case? Kit includes: double-sided to fit your case, chip to run both sides of new drive, hardware, and detailed instructions. Easy! Takes only 5 minutes!

Model 500 , 501, or 502 Only $119.

All drives are new and fully assembled. We ship only FULLY TESTED and CERTIFIED at these low prices. We use Fuji, YE Data, and other fine brands. No drives are used or surplus unless otherwise stated to you when you order. We appear to be the one of the few advertisers in Rainbow who can truly make this claim. We have 7 years experience in the CoCo disk drive market! We are able to provide support when you have a problem.

Drives 1 Year Warranty

OWL Phones

Order Numbers (only)
1-800-245-6228
1-215-682-6855
Fax: 1-215-837-1942
Technical Help
1-215-837-1917

OWL WARE Software Bundle

Disk Tutorial/Utilities/Games
DISK TUTOR Ver 1.1

Learn how to use your disk drive from this multi-lesson, machine language program. This tutor takes you through your lessons and corrects your mistakes for a quick, painless disk drive introduction. (This professionally written tutor is easily worth the bundle's total price.)

3 UTILITIES

A copy verify, copy, and DOS utility.

2 GAMES

We will select 2 games from our stock. These are sold for more than $20 each.

Do not mistake this software with cheap "Public Domain" software which others offer. All of this software is copyrighted and professional in quality. The tutor is unique with us and has helped thousands of new users learn their disk drive.

only $27.95
(or even better)
only $6.95 with
any Disk Drive Purchase!!

512K Upgrade

Again at a popular price. Fully assembled and tested before shipping. Easy to install. Uses fast 120 ns. chips.

Only $85.

Now includes **memory test, Ram Disk Lighting, Printer Lighting, and Back-up Lighting.** All with an upgraded manual exclusive with OWL!

Our prices include a discount for cash but do not include shipping.

OWL-WARE has a liberal warranty policy. During the warranty period, all defective items will be repaired or replaced at our option at no cost to the buyer except for shipping costs. Call our tech number for return. Return of non-defective or unauthorized returns are subject to a service charge.

OWL-WARE
P.O. BOX 116
Mertztown, PA 19539

A software technique that eliminates the cartridge-interrupt problem

Interrupted Again

by Robert Gault

Valuable information about the proper use of the GIME cartridge-interrupt line appears in two articles in past issues of THE RAINBOW: "The OS-9 CART* Interrupt Fix" by Marty Goodman (November 1989, Page 50), and "CoCo 3 GIME CART* IRQs Explained" by Bruce Isted (August 1990, Page 20). Any programmer working with software or hardware that depends on interrupts should read these articles.

I use a no-halt, Disto Super Controller II with my CoCo system. This controller worked fine in the no-halt mode until I installed a Multi-Pak Interface. I found I could not use the no-halt drivers with the CoCo 3, OS-9 Level II, the controller and the Multi-Pak Interface. Because of these difficulties, I found the previously mentioned articles of great interest.

Bruce Isted stated in his article that the no-halt Disto drivers use the GIME-toggle technique and should handle interrupts correctly. I disassembled the drivers and determined they do indeed use this technique. So having proper drivers is clearly not enough. I eagerly tried the toggle technique presented by Bruce for the clock module since I was reluctant to do the hardware modification described in Marty Goodman's article.

I found the patches as listed in Bruce's August 1990 article do not work. I had no reason to doubt the technique should work since the information originated with both Tandy and Kevin Darling. After careful examination of the code in the article by Bruce Isted, I found the problem and verified my finding through further testing and comparison with the Disto/Darling drivers.

Robert Gault has a Ph.D. in chemistry. He began programming with a gray CoCo 1 and has written articles for THE RAINBOW and many former Color Computer publications. He can be contacted at 832 N. Renaud, Grosse Pointe Woods, MI 48236 Please include an SASE when requesting a reply.

A Fix for a Fix

The assembly-language source code in Listing 1 is a modified reprint of Listing 1 from Bruce's article. The change is commented and involves the addition of a single instruction that corrects a subtle error in the logic of the original version.

The BASIC09 procedure in Listing 2 can be used with Bruce's BASIC09 `Filepatch` procedure to produce a new clock module. Please consult the original article for specific information about `Filepatch`.

Use a text editor or the OS-9 `build` and `edit` commands to enter the procedure in Listing 2. Save the file as `clock60.ptc` in the root directory of a backup of your Boot/Config/BASIC09 disk. Also, put a copy of `Filepatch.b09` from the August 1990 issue in the root directory of this disk.

After copying both files, make sure the Boot/Config/BASIC09 disk is Drive `/d0`. Enter the following commands:

```
load /d0/cmds/basic09
chd /d0/modules
rename clock.60hz clock.60hz.old
basic09
```

At BASIC09's B: prompt, enter

```
load /d0/filepatch.b09
run filepatch ("clock60.ptc","cl
ock.60hz.old","clock.60hz")
```

When `Filepatch` finishes its work, enter `bye` to exit BASIC09. At this point you can enter `chx /d0/cmds` and run `config` to create a new system disk with the modified clock module.

Nuts 'n Bolts

As originally published, the `irqpoll.asm` routine loads Register A with the GIME IRQ-Enable image. This is transferred to Register B for temporary storage. Bit 0 of Register A is turned off by the `ANDA #%11111110` instruction. The value in Register A is then stored in the GIME IRQ-Enable register at $FF92. The result is that the IRQ interrupt is disabled.

At this point the value in Register B is stored in $FF92. The assumption, as stated in the article, is that this reactivates the GIME IRQ line, and a trapped interrupt can then be processed. But this assumption is valid only if the IRQ-Enable image has Bit 0 set. This cannot be reasonably assumed under all conditions. The single instruction I added, `ORB #1`, guarantees that Bit 0 is set and the IRQ line is indeed enabled, if only briefly. Note that since the IRQ-Enable register image has not been changed, the system could not be expected to eventually reset itself to whatever status has been indicated.

I am happy to report that the Disto SC-II controller now works perfectly in the no-halt mode, both with and without a Multi-Pak Interface.

RAINBOW ON DISK Subscribers

For your convenience, `Filepatch.b09` is included with `clock60.ptc` on this month's RAINBOW ON DISK. To copy both files, insert the July 1991 RAINBOW ON DISK in Drive `/d0` and enter

```
copy -s /d0/source/filepatch.b09
 /d0/filepatch
```

and

```
copy -s /d0/source/clock60.ptc /
d0/modules/clock60.ptc
```

Follow the prompts, inserting a backup of the Boot/Config/BASIC09 disk as the destination disk and the RAINBOW ON DISK as the source disk. ❑

Listing 1: irqpoll.asm

```
D.Poll  equ   $0026
D.IRQER equ   $0092
D.IRQS  equ   $00AF
IRQEnR  equ   $FF92

IRQPoll jsr   [D.Poll]
        bcc   IRQPoll
GToggle lda   #%11111110
        anda  <D.IRQS
        sta   <D.IRQS
        lda   D.IRQER
        tfr   a,b
        anda  #%11111110
* new instruction to guarantee IRQ line enables *
        orb   #1
***********************************************
        sta   >IRQEnR
        stb   >IRQEnR
        clrb
        rts
```

Listing 2: clock60.ptc

```
* FilePatch patch file to add
* revised GIME CART* toggle
* to unmodified Clock.60Hz
* from CoCo 3 OS-9 Level II
C 0002 01 02
C 0003 EE 0C
C 0008 17 F6
C 000A A8 C6
C 0012 09 0A
C 0015 7E 9C
C 0018 00 1E
C 001B 41 5F
C 0034 04 06
C 0035 DC 30
C 0036 26 8D
C 0058 C4 C2
C 0086 DC 9E
C 0088 DD 9F
C 00BE 06 04
C 00BF AD 8D
C 00C0 9F B1
C 00C1 00 20
C 00C2 26 02
C 00C3 24 8D
C 00C4 FA B3
C 0191 D6 C6
C 01B9 70 52
C 01C5 4D 2F
I 0037 02 00 57
I 0090 08 AD 9F 00 26 24 FA 86 FE
I 0098 08 94 AF 97 AF 96 92 1F 89
I 00A0 08 84 FE CA 01 B7 FF 92 F7
I 00A8 04 FF 92 5F 39
V
* CRC bytes for comparison only
*C 0207 D2 E4
*C 0208 8A 6D
*C 0209 FD 1B
```


PUT YOUR COCO TO WORK. . .

RAINBOW CERTIFICATION SEAL

SALE!

CHECK WRITER. Uses your printer and standard bank checks to help you monthly with your accounts. Saves files, reloads, edits and pauses printer to let you write in amounts. Has index screen. Manual. $19.95

BANKMAN. Continuously updates your check book. Save, edit and print files. Lets you analyze spending; reconciles, summarizes banking transactions. With manual. .$29.95

INVENTORY MANAGER from Forrest Enterprises. Writes invoices, keeps track of stock, saves time and money. $24.95

GENERAL STATISTICS. Computes over 50 stats, including Standard deviation & Std. error, Covariance, Correlation, Chi-Sq. & ANOVA. Includes screen tables and manual. Edits, Saves & Prints data. User friendly. Great for H.S. & College students. $29.95

ENVELOPE WRITER. Prints return and mailing addresses directly on the envelope with a DWP or on tractor envelopes with a DMP. Saves on labels! Memorizes return addresses. Prints custom fonts with all printers. Perfect for small or large jobs. . . $17.95

BRAINBUSTERS. Multiple Choice/True-False Test Writing program. Lets you Save, Edit, Select, Randomize & Print. Many more options. Use for business or fun. . . . $29.95

THE EXAMINER. Use with above program to take "On Screen" tests. Grades and Saves results. For home or classroom. . . $19.95

TRIVIA 1-3. Try these BRAINBUSTER quizzes. History, Sports, Sci., etc. Each $5.95

BASEBALL STATS. Keeps track of 20 stats. Continuously updates. Full of options! User friendly. Includes manual. $29.95

QUICK STATS. A baseball scoreboard! Keeps track of over a dozen stats. Lets you Save, Edit, and Print out data. Manual. . . $22.95

BALL CARDS. A database for all sports card collectors. Super fast find and retrieval of record files. Manual. . . . $19.95

COCO LABELS. Prints fancy fonts with all printers. Select names from alphabetical screen index. Prints duplicates. . . .$19.95

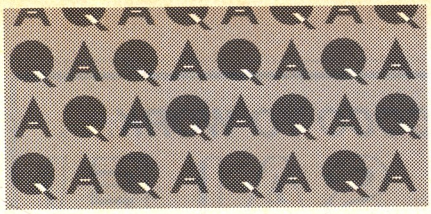
CALCULATOR. One of a kind. Prints out! Simulates adding machine. All standard functions plus 7 memory banks. . . . $14.95

Specify COCO 1, 2 or 3. Disk Only. Send check or money order. Add $3.00 Shipping/Handling. Illinois Residents add 6.25% Sales Tax.

TRADING POST

DISTRIBUTORS OF 5-STAR SOFTWARE

P.O. BOX 3453
CARBONDALE, IL
62902



Serial Connections

by Marty Goodman
Contributing Editor

I'm having a problem connecting a printer to the 4-pin (bit-banger) serial port on my CoCo 3. I used a modem cable with a DB-25 connector that worked just fine on my modem. What is the trouble?
Carl J. Boll (CBJ)
Chicago, Illinois

A Proper cables for connecting a printer to the 4-pin port on the rear of the CoCo differ in their wiring from proper cables for connecting a modem to the port. The pinout for a modem cable is as follows:

4-pin DIN	DB-25	Description
1	8	carrier detect
2	3	data from modem
3	7	ground
4	2	data to modem

While, for a printer cable, you'd typically have:

4-pin DIN	DB-25	Description
1	n/c	
2	20	busy handshake
3	7	ground
4	3	data to printer

Note that you may have to check the manual for your printer or printer buffer to make sure the device uses Pin 20 for handshaking and that it uses a Low signal to mean that the printer or buffer is busy. Some printers allow you to set which pin the handshake signal is on and/or the polarity of the busy handshake using DIP switches in the printer.

When you use the 4-pin port to talk to a printer, serial data need only go one way — to the printer. The only communication in the other direction is of a far less complex sort than serial data. A handshake line that is either High (printer ready to receive data) or Low (printer is busy) tells the computer to stop sending data. Thus, Pin 4 of the CoCo serial port, which is used to receive serial data when the port is used with a modem, is reprogrammed by the printer driver to act as a handshake line. Pin 1 is not used because it is an oddball and complicated control pin inside the computer, and for non-interrupt-related functions, it is best left alone. It is used for modem communications as a carrier detect line only because all other available lines on the 4-pin port are already used.

Back-to-Back Modems

I'm trying to transfer text files from a Commodore 64 to a Color Computer. I have modems hooked to both the Commodore 64 and my CoCo 3. I have also connected the two wires from the telephone line coming out of the modems. I am having trouble getting one modem to answer the other one, though. Can you help me?
Don Vaillancourt (DONVAIL)
Mississauga, Ontario
Canada

A Data transfer between a Commodore 64 and a CoCo 3 is a bit tricky. With most other computers, I'd have told you to dispense with the modems and just use a null-modem cable. However, the Commodore 64's serial port is not standard. It uses RS-232 signal protocol, but not RS-232 voltage levels. Instead, it uses TTL voltage levels. To make matters worse, the disk data-storage format is utterly incompatible with CoCo disk controllers, so no "read alien disk" program is possible on the CoCo. If you were a hacker, I'd suggest you make level-converter circuitry for the Commodore 64 serial port (using 1488 and 1489 or equivalent level-converter chips) and then use a null-modem cable. However, since you have terminal programs and modems working with both computers, perhaps the simplest approach would be to upload the files in question from your Commodore to your Workspace on Delphi. Just type WS at the CoCo SIG prompt, then type XUP to Xmodem upload (you can use YUP and ZUP for Ymodem and Zmodem) and follow the prompts. Then logon with your Color Computer, go to Workspace and XDOW (YDOW or ZDOW) the files using Xmodem (Ymodem or Zmodem).

You may still encounter some problems because Commodore ASCII files are not international standard ASCII. If your terminal program on the Commodore 64 does not make certain translations, you may have to write a simple BASIC conversion program that changes the values of certain characters in the ASCII files you got from the Commodore. The problems involved include reversal of upper- and lowercase and/or certain characters on the Commodore that are used for graphics and control functions. Your approach of hooking one modem directly to another, while a bit overly complicated, should work. Perhaps you failed to put one modem into Answer mode. If the modems are Hayes-compatible, type

---

Martin H. Goodman, M.D., a physician trained in anesthesiology, is a longtime electronics tinkerer and outspoken commentator — sort of the Howard Cosell of the CoCo world. On Delphi, Marty is the SIGop of RAINBOW's CoCo SIG and database manager of OS-9 Online. His non-computer passions include running, mountaineering and outdoor photography. Marty lives in San Pablo, California.

ATA when in Command mode to force one modem off hook and into Answer mode. With the second modem in Command mode, enter ATD to put it into Originate mode and attempt to connect it to the other modem.

RS-232 Signal Levels

Q *Why does RS-232 signal protocol dictate the use of +12 and -12 volts? I thought inside today's computers — especially laptops — 5 volts is the only voltage level used.*

Tika Car
Rochester, New York

A RS-232 protocol specifies that a one is a voltage of between 5 and 15 volts and a zero is a voltage of between -5 and -15 volts, both at the transmitter site. It also specifies that, by the time the signal gets to the receiver, the one must be at least 3 volts and the zero must be no higher than -3 volts. This results in a minimum distinction between zero and one of 6 volts. In practice, RS-232 voltages tend to be around 10 to 12 volts (plus and minus), resulting in a distinction between a one and a zero of over 20 volts. This great voltage difference between the one and zero is what makes RS-232 such a rugged signal-transmission protocol. Even when RS-232 signals are sent over wires of over 100 feet, the small amount of degradation of the voltage, and noise caused by that run of cable, is unlikely to affect the ability of the receiver to figure out what the transmitter is sending. Thus, even though a lap computer may indeed use 5 volts for nearly all its functions, it has a source of +12 and -12 volts (sometimes just inside one chip, the RS-232 level-converter chip) to produce industry standard RS-232 voltage levels.

In contrast, TTL signal levels specify a zero with a voltage of between .9 and 2.4 volts and specify a one with a voltage of 3.4 to 5 volts. As you can see, the distinction between a one and a zero is far smaller, as is the range of acceptable voltages. Thus, TTL signal levels are far more susceptible to noise and voltage degradation when run over long cables. IBM printer cables, for example, are best kept under 12 feet. Robust TTL parallel-printer cables (larger gauge wire and/or cables with every other wire at ground, or using twisted pairs of ground and signal for each data and control line) can work at lengths of 25 feet or more, but are not generally recommended.

Interfacing with Lightning

Q *The power line near my house was recently struck by lightning. At that time, my CoCo 2 was plugged in, but was not turned on. After the lightning struck, some of the other appliances that were on at the time were not damaged, but my CoCo 2 would not work. A closer inspection found that the fuse between the AC and the transformer had blown. Why? How should I proceed with repairing my faithful, old CoCo 2?*

Kelly Thompson
Otis, Colorado

A The CoCo (all models) always has power going to the power transformer while it is plugged in. The power switch on the CoCo interrupts the low voltage as it leaves the secondary of the transformer. This explains why most people note their CoCos are a bit warm near the transformer, even when not turned on. I believe Tandy must have designed the CoCo this way for reasons relating to the added expense of installing a 110-volt AC switch and/or the hassle of clearing such a switch with Underwriters Laboratories or some federal regulatory agency. Thus, when lightning struck your power line, the surge ran right into the transformer blowing the AC fuse. If you are lucky, mere replacement of the fuse will restore your CoCo to operation. It is possible, however, that the surge cooked some of the windings on the primary of the transformer, which would require replacement of the transformer. The CoCo's transformer supplies roughly 20 volts center-tapped. You can replace it with a 2-amp 18-volt center tapped transformer of the sort available from Radio Shack. Of course such a replacement will have to be mounted outside the CoCo, since it will not fit inside the case. Note that CoCo 2s can be found used at garage sales and swap meets for $10 to $25, so you might not want to spend too much time and money fixing the one you have.

RGB-I Meets RGB-A

Q *I have a Tandy 1000HX with a 9-pin color RGB connector. I want to adapt my CM-8 to work with this video output. How do I do this? What is the pinout for the connector on my 1000HX?*

David J. Fall
West Valley, Utah

A The 1000HX uses IBM CGA-type RGB video. The standard pinout on a DB-9 connector for this is as follows:

Pin	Description
1, 2	Ground
3, 4, 5	Red, Green, Blue (respectively)
6	Intensity
7	not used
8, 9	HSync and VSync (respectively)

CGA RGB video is similar enough to that of the CoCo 3 that you likely can get an image using your CM-8. However, you will be able to get only six colors plus black and white with the CM-8. You will not be able to display all 14 colors (plus black and white) that are supported by CGA video. The reason is that the CM-8 has no provisions for supporting the Intensity line of the CGA protocol. Just connect all like-named signal lines between the CM-8 and the IBM CGA port of the 1000HX, and you likely will get an acceptable image, apart from the fact that the resolution of the CM-8's screen is so poor (.51 mm dot diameter) that it is marginal for display of 80-column text. There is a remote possibility that sending TTL-level video signals into the analog-level inputs of the CM-8 could damage its input chip, though to date I've had no reports of such damage from others who have used their CM-8s with IBM-type CGA video signals.

Repackaging the CoCo

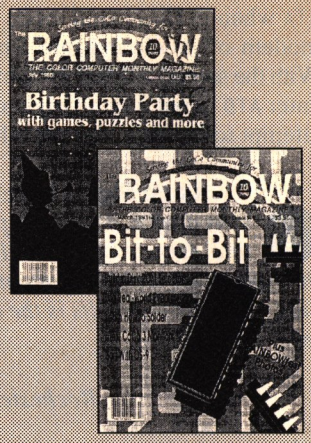
Q *I know you don't like using a Y cable or 40-pin ribbon cables on the CoCo system bus. However, I may be forced to use at least a short length of such cable in the course of shoe-horning my CoCo 3, Multi-Pak Interface and various devices into a PC/AT-type case. Is it any better if I run the 40-conductor cable between the Multi-Pak and a given device, as opposed to between the CoCo and the Multi-Pak? How about using a very short length of cable to mount the Multi-Pak at angles of 90 or 180 (back-to-back) degrees with respect to the CoCo motherboard? Is there any way to make a more reliable and rugged wire connection between a CoCo and a Multi-Pak or between a Multi-Pak and another device?*

Bob Kemper (BOBKEMPER)
Fort Stewart, Georgia

A Many years ago I made a repackaged Color Computer in which I had the Multi-Pak mounted back-to-back with the CoCo 1 motherboard. I used a very short length (less than one inch) of 40-conductor ribbon cable. I also ran 14-gauge ground wires between the ground tabs of the Multi-Pak and the CoCo motherboard. With this arrangement, I never had the slightest reliability problem. So, yes, you can use a ribbon cable to bend the connection between your CoCo 3 and Multi-Pak, provided you keep that cable as short as possible (under one inch) and you also link the grounds on both boards with a nice, thick, ground wire or strap. It is equally bad, however, to have a long ribbon cable between the CoCo and Multi-Pak as it is to have one between the Multi-Pak and a plug-in device. Some devices are far more sensitive to the presence of a cable. A floppy disk controller, for

Yes! They're still available

Rainbow Back Issues



BACK ISSUES STILL AVAILABLE
Have you explored the wealth of information in our past issues? From our very first, four-page issue to many with more than 300 pages of material, it's all just for CoCo users — a great way to expand your library!

A WORLD OF INFO AT A BARGAIN PRICE
All back issues sell for the single issue cover price. In addition, there is a $3.50 charge for the first issue, plus 50 cents for each additional issue for postage and handling if sent by United Parcel Service. There is a $5 charge for the first issue, plus a $1 charge for each additional issue on orders sent by U.S.Mail. UPS will not deliver to a post office box or to another country.

MOST ISSUES STILL AVAILABLE
Available issues through June 1982 are provided on white paper in a reprint form. All others are in regular magazine form. VISA, MasterCard and American Express accepted. Kentucky residents please add 6 percent sales tax; Canadian residents, 7 percent GST. In order to hold down costs, we do not bill, and no C.O.D. orders are accepted.

Due to heavy demand, we suggest you order the back issues you want now while supplies last. To order, review and fill out the form below and mail it with your payment.

For greater convenience, order through the Rainbow Magazine Services area of our Delphi CoCo SIG.

RAINBOW INDEX
A complete index for, July 1981 through June 1984, is printed in the July 1984 issue. Separate copies are available for $2.50 plus 50¢ handling. Indexes for subsequent years are published annually in the July issues of THE RAINBOW.

TOTAL _____
KY RESIDENTS ADD 6% _____
CANADIAN RESIDENTS ADD 7% GST _____
U.S. MAIL CHARGE _____
SHIPPING & HANDLING _____
U.P.S. CHARGE _____
TOTAL AMOUNT ENCLOSED _____

Article Reprints
In instances where a given issue is now out of print and not available for purchase, we do provide photocopies of specific articles. The cost for this service is $1.50 plus 50 cents S/H per article. This service is provided *only* in the case of out-of-stock issues.

Name _____
Address _____
City _____ State _____ Zip _____
❑ Payment Enclosed, or
Charge to my: ❑ VISA ❑ MC ❑ AE
CARD # _____
EXPIRATION DATE _____ PHONE ( ) _____
SIGNATURE _____

TO ORDER BY PHONE (credit card orders only) call (800) 847-0309, 9 a.m. to 5 p.m. EST. All other inquiries call (502) 228-4492.
send to: THE RAINBOW, The Falsoft Building, P.O. Box 385, Prospect, KY 40059

Please send me the following back issues:

	VOLUME 1				**VOLUME 2**		
JUL 81	Premier Issue	$2.00	❑	JUN 83	Printers	$2.95	❑
AUG 81		$2.00	❑		**VOLUME 3**		
NOV 81		$2.00	❑	AUG 83	Games	$2.95	❑
FEB 82		$2.00	❑				
SEP 83	Education	$2.95	❑				
OCT 83	Graphics	$3.95	❑				
MAR 84	Business	$3.95	❑				
APR 84	Gaming	$3.95	❑				
MAY 84	Printer	$3.95	❑				
JUN 84	Music	$3.95	❑				
JUL 84	Anniversary	$3.95	❑				
	VOLUME 4						
AUG 84	Games	$3.95	❑				
SEP 84	Education	$3.95	❑				
OCT 84	Graphics	$3.95	❑				
NOV 84	Data Comm.	$3.95	❑				
DEC 84	Holiday	$3.95	❑				
JAN 85	Beginners	$3.95	❑				
FEB 85	Utilities	$3.95	❑				
MAR 85	Business	$3.95	❑				
APR 85	Simulations	$3.95	❑				
MAY 85	Printer	$3.95	❑				
JUN 85	Music	$3.95	❑				
JUL 85	Anniversary	$3.95	❑				
	VOLUME 5						
AUG 85	Games	$3.95	❑				
SEP 85	Education	$3.95	❑				
OCT 85	Graphics	$3.95	❑				
NOV 85	Data Comm.	$3.95	❑				
DEC 85	Holiday	$3.95	❑				
JAN 86	Beginners	$3.95	❑				
FEB 86	Utilities	$3.95	❑				
MAR 86	Business	$3.95	❑				
APR 86	Home Help	$3.95	❑				
MAY 86	Printer	$3.95	❑				
JUN 86	Music	$3.95	❑				
JUL 86	Anniversary	$3.95	❑				
	VOLUME 6						
AUG 86	Games	$3.95	❑				
SEP 86	Education	$3.95	❑				
OCT 86	Graphics	$3.95	❑				
NOV 86	Data Comm.	$3.95	❑				
DEC 86	Holiday	$3.95	❑				
JAN 87	Beginners	$3.95	❑				
FEB 87	Utilities	$3.95	❑				
MAR 87	Business	$3.95	❑				
APR 87	Home Help	$3.95	❑				
MAY 87	Printer	$3.95	❑				
JUN 87	Music	$3.95	❑				
JUL 87	Anniversary	$3.95	❑				
	VOLUME 7						
AUG 87	Games	$3.95	❑				
SEP 87	Education	$3.95	❑				
OCT 87	Graphics	$3.95	❑				
NOV 87	Data Comm.	$3.95	❑				
DEC 87	Holiday	$3.95	❑				
JAN 88	Beginners	$3.95	❑				
FEB 88	Utilities	$3.95	❑				
MAR 88	Business	$3.95	❑				
APR 88	Home Help	$3.95	❑				
MAY 88	Printer	$3.95	❑				
JUN 88	Music	$3.95	❑				
JUL 88	Anniversary	$3.95	❑				
	VOLUME 8						
AUG 88	Games	$3.95	❑				
SEP 88	Education	$3.95	❑				
OCT 88	Graphics	$3.95	❑				
NOV 88	Data Comm.	$3.95	❑				
DEC 88	Holiday	$3.95	❑				
JAN 89	Beginners	$3.95	❑				
FEB 89	Home Help	$3.95	❑				
MAR 89	Hardware	$3.95	❑				
APR 89	Business	$3.95	❑				
MAY 89	Printer	$3.95	❑				
JUN 89	Summer Fun	$3.95	❑				
JUL 89	Anniversary	$3.95	❑				
	VOLUME 9						
AUG 89	Beyond BASIC	$3.95	❑				
SEP 89	Education	$3.95	❑				
OCT 89	Graphics	$3.95	❑				
NOV 89	Data Comm.	$3.95	❑				
DEC 89	Holiday	$3.95	❑				
JAN 90	Beginners	$3.95	❑				
FEB 90	Home Help	$3.95	❑				
MAR 90	Hardware	$3.95	❑				
APR 90	Business	$3.95	❑				
MAY 90	Printer	$3.95	❑				
JUN 90	Summer Fun	$3.95	❑				
JUL 90	Anniversary	$3.95	❑				
	VOLUME 10						
AUG 90	0S-9	$3.95	❑				
SEP 90	Education	$3.95	❑				
OCT 90	Graphics	$3.95	❑				
NOV 90	Data Comm.	$3.95	❑				
DEC 90	Holiday	$3.95	❑				
JAN 91	Beginners	$3.95	❑				
FEB 91	Home Help	$3.95	❑				
MAR 91	Hardware	$3.95	❑				
APR 91	Music	$3.95	❑				
MAY 91	Printer	$3.95	❑				
JUN 91	Summer Fun	$3.95	❑				
JUL 91	Anniversary	$3.95	❑				
	VOLUME 11						
AUG 91	Graphics	$3.95	❑				

example, is least likely to tolerate any amount of ribbon cable between it and the Multi-Pak. A serial card, however, is most likely not to mind being extended some inches from the Multi-Pak.

Yes, there are tricks you can use to make a ribbon-cable bus extender less likely to cause problems. You can make the extender from separate wires for each signal line instead of wires running in parallel all the way. This minimizes interference between one wire and another. Better yet, use a twisted pair of separate wire (with one wire of each pair being ground) for every one of the 35 signal lines (I exclude the two ground, the +5 volt line, and the +12 and -12 volt lines). Such a twisted-pair extender cable would be quite tedious to make, but I suspect it would offer a substantial advantage over any ribbon cable in terms of its ability to work reliably at moderate lengths.

Super BASIC Errors

Q *I am having a problem with the* ON ERROR GOTO *function in Disk Extended Color BASIC 2.1. When I got an error reading a disk file, the computer could not find the line number of my* GOTO *statement, despite the fact I had provided it properly. What's going on here?*

Fred McDonald
New Haven, Connecticut

A You have found one of the many errors in Super Extended BASIC. The error trap neglects to reset the output device to the screen so, if the error is a disk error, the error message is printed to the disk buffer instead of to the screen and you don't see it. The fix is to put POKE 111,0 at the beginning of your error-trap routine to set the output to the screen. I don't know why you got a UL error.

High-Density Drives

Q *I am considering the possibility of using 3½-inch, 1.44-megabyte drives with my OS-9 system. How many tracks do they have and what hardware will I need?*

Philip Brown
Berkeley, California

A Both 720K and 1.44-Meg 3½-inch drives have 80 tracks. However, the 1.44-Meg drives use a data density and data-transfer rate that is twice that of 720K drives. Normal CoCo floppy controllers cannot handle such drives. Some CoCo hard drive systems include floppy controllers on the hard drive controller card that can handle higher-density (1.2-Meg and 1.44-Meg) floppies and include OS-9 drivers for such floppies.

Your technical questions are welcomed. Please address them to CoCo Consultations, THE RAINBOW, P. O. Box 385, Prospect, KY 40059.

We reserve the right to publish only questions of general interest and to edit for brevity and clarity. Due to the large volume of mail we receive, we are unable to answer letters individually.

Questions can also be sent to Marty through the Delphi CoCo SIG. From the CoCo SIG> prompt, pick Rainbow Magazine Services. Then at the RAINBOW> prompt, type ASK (for Ask the Experts) to arrive at the EXPERTS> prompt, where you can select the "CoCo Consultations" online form, which has complete instructions.

Never Forget!

Ever wish that your computer could display your schedule for the day on start up? Ever wanted some utilities to perform repetitive maintenance tasks on Gcal data files? Or, perhaps you needed to print Gcal calendar data, and couldn't. MV Systems' OS-9 Calendar Utilities will handle all of these tasks and more! These utilities make excellent companions to the Gcal program supplied with Multi-Vue. Or they may be used independently to perform many handy scheduling tasks for you. *Requires Tandy Color Computer 3 w/128k, disk drive, and OS-9 Level 2. Multi-Vue Recommended.*

$14.95

High Finance

Perform a wide variety of financial analysis calculations and create schedules of periodic data with this easy to use Multi-Vue application. Intelligent financial decisions are just a point and click away! Includes fantastic on-line tutorials which help you learn to use the program quickly and easily. Includes present/future value, sinking fund, loan amortization, depreciation, and much more! *Requires Tandy Color Computer 3 w/128k (256k/512k/1024k recommended), disk drive, mouse/joystick, and OS-9 Level 2 w/Windint module. Multi-Vue recommended.*

$24.95

Software Developers: MV Systems needs quality OS-9 software to market. If you have written (or are writing) software you would like to market, contact us for details!

* * * * *

Please add $2.50 shipping and handling to all orders.

MV Systems
P.O. Box 818
Arvada, CO 80001
(303) 420-7777

The OS-9 and Multi-Vue specialists!

SUMMER SIZZLER SALE

We've put our most popular groups on sale to help you beat the summer heat. Sale ends August 31, 1991.

NEW NEW NEW NEW NEW NEW

Deception Path: Sliding tiles challenge you in this ever- changing maze. Fun for all ages. 1-4 players. $19.95

Soviet Bloc: Form solid rows from falling block shapes in this super Tetris-type game. $19.95

Each program plays on a 128K CoCo3. Disk required. Joystick required for Deception Path.

Save $10.00! Buy both for only $30.00!

SOLITAIRE CARD GAMES

Classic Solitaire: Three games in one. Klondike, Canfield and Pyramid on one disk for just $14.95

La Belle Lucie: Very addicting. Once played, this solitaire quickly becomes a favorite. $14.95

All play on 128K CoCo3, with joystick and disk.

Solitaire Special: Both disks for just $25.00!

Tazman (requires OS9/LII and 512K) $24.95
Kyum-Gai -To Be Ninja. OS9 Version (512K/OS9) $29.95
Zenix (CoCo3 128K Disk) $29.95
Crystal City (CoCo3 128K Disk) $34.95
Armchair Admiral (CoCo3 128K Disk) $14.95
Riddle of the Ring (CoCo3/CoCo2 128K Disk) $10.00
Games Pack (CoCo3/CoCo2 128K Disk) $10.00

Software submissions invited

Checks, Money Orders, MasterCard & Visa $2.50 S&H
COD $2.00 extra. WA addresses add 8.2% sales tax.

Eversoft Games, Ltd
P.O. Box 3354
Arlington, WA 98223

(206) 653-5263
10am - 6pm PST

30 day money back guarantee

A battle of wits against alien forces

Megatank

by Marshall Weisenbrger

Welcome to the world of *Megatank*. Your mission is to save your home planet from alien invasion. But to accomplish your goal, you must battle five different waves of aliens — choppers, blades, bats, saucers and fireballs. For each successful attack, you are awarded a certain number of points, based on the type of alien. Points are awarded as follows:

Choppers	100 points
Blades	250 points
Bats	500 points
Saucers	1000 points
Fireballs	1500 points.

As written, *Megatank* requires a CoCo 3 and a two-button joystick. If your joysticks have only one button, see the modifications listed below.

You begin the game with four extra tanks (called ships) and two Super Savers. To shoot, just press the firebutton. For every five missed shots, you lose one tank. But for each successfully completed wave — without a missed shot — you gain one Super Saver. Super Savers can be very helpful since they destroy all onscreen aliens. To activate a Super Saver, press the second button on your two-button joystick.

Megatank Modifications

If you don't have a two-button joystick, you can alter *Megatank* so you can use the space bar in place of the second joystick button. To do this, replace Line 260 with

```
260 HPUT(A1,179)-(A1+36,191),1,P
SET: A$=INKEY$: IF A$<>"" THEN G
OSUB 560
```

Megatank is written for use with an RGB

CoCo 3

```
110 ..... 250   900 ..... 159   1420 ..... 174
220 ..... 153   950 ..... 96    1530 ..... 162
300 ..... 209   1020 ..... 25   1640 ..... 5
410 ..... 154   1060 ..... 237  1710 ..... 216
470 ..... 189   1120 ..... 68   1830 ..... 207
570 ..... 26    1170 ..... 76   1910 ..... 244
660 ..... 176   1230 ..... 113  END ..... 22
780 ..... 82    1290 ..... 240
850 ..... 146   1330 ..... 218
```

The Listing: MEGATANK

```
1 'MEGATANK
2 'BY MARSHALL WEISENBURGER
3 'COPYRIGHT (C) AUGUST 1991
4 'BY FALSOFT, INC.
5 'RAINBOW MAGAZINE
10 '*****************************
20 '*       MEGA TANK           *
30 '*          BY               *
40 '*  MARSHALL WEISENBURGER    *
50 '*        8/20/87            *
60 '*****************************
70 ON BRK GOTO 1970
80 POKE 65497,0:P$="O1L225CDEFG"
90 GOTO830
100 '***MAINLOOP***
```

Marshall Weisenburger is pursuing a degree in electrical engineering from Bradley University. He has been programming with a CoCo for over two years. You may contact him at 911 N. University, Geisert 0614, Peoria, IL 61606. Please include an SASE when requesting a reply.

```
110 A=JOYSTK(0)
120 IFA<15THENA1=A1-8
130 IFA>53THENA1=A1+8
140 IFA1<0THEN A1=0:HPUT(A1,179)
-(A1+36,191),3:A1=198
150 IFA1>199THEN A1=199:HPUT(A1,
179)-(A1+36,191),3:A1=0
160 Y=Y+R:IFY>135THENGOSUB640:GO
SUB600
170 D=D+.2:E=SIN(D):IFE>0THEN X=
X+I ELSE X=X-I
180 IFX=322THEN210
190 IFX>207THENX=207
200 IFX<0THENX=0
210 H=H+1:IFH=1THENPALETTE13,W:P
ALETTE14,V
220 IFH=2THENPALETTE14,W:PALETTE
15,V
230 IFH=3THENPALETTE15,W:PALETTE
13,V:H=0
240 HPUT(X,Y)-(X+28,Y+17),U,PSET
:IFG=1THEN260
250 HPUT(X1,Y)-(X1+28,Y+17),U,PS
ET
260 HPUT(A1,179)-(A1+36,191),1,P
SET:IFBUTTON(1)=1THENGOSUB560
270 IFBUTTON(0)=0THEN110
280 SOUND230,1:B=A1+19:HCOLOR3,0
:HLINE (B,155)-(B,0),PSET:HCOLOR
0,0: HLINE (B,155)-(B,0),PSET
290 IF X+14>B-14 AND X+14<B+14 T
HEN 320 ELSE IF X1+14>B-14 AND X
1+14<B+14 THEN 380
300 M2=1:M1=M1+1:HCOLOR0,0:HLINE
(249,71)-(279,79),PSET,BF:HCOLOR
4,0:HPRINT(31,9),M1:IF M1<5THEN1
10
310 M1=0:SOUND1,2:SOUND1,2:SOUND
1,2:HCOLOR0,0:HLINE(249,71)-(279
,79),PSET,BF:HCOLOR4,0:HPRINT(31
,9),M1:GOSUB670:GOTO110
320 GOSUB750
330 HCOLOR0,0:HLINE(X,Y)-(X+28,Y
+17),PSET,BF:X=322:I=0:J=J+1
340 S=S+T:GOSUB440
350 IFJ=1ANDG=1THENGOSUB600:GOTO
100
360 IFJ=2THENGOSUB600:GOTO100
370 GOTO110
380 IFG=1THEN110
390 GOSUB760
400 S=S+T:GOSUB440
410 HCOLOR0,0:HLINE(X1,Y)-(X1+28
,Y+17),PSET,BF:X1=329:J=J+1
420 IFJ=2THENGOSUB600:GOTO100
430 GOTO110
440 '*** SCORE ***
450 IF S=1000THEN HCOLOR0,0:HLIN
E(X,Y)-(X+28,Y+17),PSET,BF:HLINE
(X1,Y)-(X1+28,Y+17),PSET,BF:GOSU
B600:GOSUB800:R=4:T=250:U=5:V=38
:W=0:I1=3:M2=0
460 IF S=4000THEN HCOLOR0,0:HLIN
E(X,Y)-(X+28,Y+17),PSET,BF:HLINE
(X1,Y)-(X1+28,Y+17),PSET,BF:GOSU
B600:GOSUB800:R=6:T=500:U=6:V=36
:W=0:I1=4:M2=0
470 IF S=12000THEN HCOLOR0,0:HLI
NE(X,Y)-(X+28,Y+17),PSET,BF:HLIN
E(X1,Y)-(X1+28,Y+17),PSET,BF:GOS
UB600:GOSUB800:R=7:T=1000:U=7:V=
36:W=63:I1=5:M2=0
```

monitor. To alter it for use with a color composite monitor or TV, make the following changes:

1) Change the values of Variable V as shown in this table:

Line#	Value	Change to
450	38	22
460	36	6
470	36	6
480	55	51
1920	36	6

2) In Line 480, change W=32 to W=7.

3) Replace lines 1640, 1960 and 1970 with the following:

```
1640 PALETTE 0,0: PALETTE 1,13:
PALETTE 2,12: PALETTE 3,23: PALE
TTE 4,33: PALETTE 5,33: PALETTE
6,6: PALETTE 7,51: PALETTE 8,9:
PALETTE 9,0: PALETTE 10,51: PALE
TTE 11,32: PALETTE 12,0: PALETTE
13,9: PALETTE 14,0: PALETTE 15,0

1960 DATA CHOPPERS,100,4,6,0,BLA
DES,250,5,22,0,BATS,500,6,6,0,SA
UCERS,1000,7,6,63,FIREBALLS,1500
,8,51,7

1970 CMP: POKE 65496,0
```

❑

Burke & Burke
P.O. Box 733
Maple Valley, WA 98038

U.S. ORDER DESK: (800) 237-2409

INT'L & TECHNICAL: (206) 432-1814

SALE

Burke & Burke Summer Software Sale!

It's August, and that means that it's time for the Burke & Burke 1991 Summer Software Sale. This month only, take $5.00 off the advertised price of each Burke & Burke software -only product you order! Orders must be postmarked prior to September 1, 1991 - order by phone for even faster service.

OS9 Software (* >= 256K; ** >= 512K required):

WORLD CLASS CHESS* -- Use your Tandy Cyrus Chess cartridge under OS9 L2	$29.95
FILE SYSTEM REPACK 1.1 -- Popular disk defragmenter. NEW VERSION!	$29.95
FILE RECOVERY SYSTEM -- helps rebuild crashed disks	$24.95
R. S. B.* -- Real Disk BASIC for Level 2 (BASIC ROM required).	$39.95
EZGEN 1.09 -- OS9 bootfile editor	$19.95
CYBERVOICE (Software only)* -- Run your S/S SuperVoice w/ OS9!	$24.95
PERTASCII* -- Multi-user scrambled letter word game.	$19.95
WILD & MV -- Wildcard & move directory entry utilities.	$19.95

BASIC Software (* >= 256K; ** >= 512K required):

HYPER-I/O -- 16K Hard disk / big floppy BASIC. Specify B&B or DISTO hard disk	$29.95
DAGGORPATCH -- Disk patch for Dungeons of Daggorath.	$ 9.95

HYPER-I/O comes on floppy disk & is EPROMable. HYPER-I/O allows large floppy and hard disk directories, with good M/L compatibility. We recommend HYPER-I/O for BBS & BASIC use, but it may be incompatible with some of your commercial ML S/W.

VISA MasterCard

Affordable Color Computer Hardware:

CYBERVOICE -- Speech Synthesizer w/ OS9 software.	$99.95
COCO XT -- Adapts PC hard drives to CoCo. OS9 S/W included.	$69.95
COCO XT-RTC -- CoCo XT, with battery backed real-time clock.	$99.95
XT-ROM -- Boots OS9 from B&B hard disk automatically.	$19.95
4' Hard disk cable set (Extra long -- standard cables are 2' or shorter)	$17.50

New Ego Killer!

World Class Chess lets you use your Tandy Cyrus Chess cartridge under OS9 Level 2. We've added mouse, disk, and windows support. Looks great, and plays a mean game of chess! Only $29.95. *(Cyrus Chess Cartridge available from TANDY Consumer Mail, P/N 26-3064, $29.95)*

WA RESIDENTS ADD 8.2% SALES TAX. U.S. COD's add $3.75. Min. U.S. shipping $4.00. Min. to Canada $5.00. Please allow 2 weeks for delivery. Overnight or 2nd- day available for in-stock items. Software upgrades $5.00 each w/receipt, including U.S. shipping.

```
480 IF S=30000THEN HCOLOR0,0:HLI
NE(X,Y)-(X+28,Y+17),PSET,BF:HLIN
E(X1,Y)-(X1+28,Y+17),PSET,BF:GOS
UB600:GOSUB800:R=8:T=1500:U=8:V=
55:W=32:I1=6:M2=0
490 HCOLOR0,0:HLINE(254,23)-(316
,30),PSET,BF
500 HCOLOR4,0:HPRINT(31,3),S
510 IF HS>S THEN RETURN
520 HS=S
530 HCOLOR0,0:HLINE(254,47)-(316
,54),PSET,BF
540 HCOLOR4,0:HPRINT(31,6),HS
550 RETURN
560 '*** SUPER SAVER TEST ***
570 IF Z=0 THEN RETURN
580 Z=Z-1:HCOLOR0,0:HLINE(249,10
3)-(279,111),PSET,BF:HCOLOR4,0:H
PRINT(31,13),Z
590 PLAY "L4O4CEG":HCOLOR0,0:HLI
NE(X,Y)-(X+28,Y+17),PSET,BF:HLIN
E(X1,Y)-(X1+28,Y+17),PSET,BF
600 '*** RANDOM SHIP POSITION **
*
610 I=I1:J=0:G=RND(2):X1=RND(207
):X=RND(207):Y=0:D=0
620 IF X-X1<40THEN610
630 RETURN
640 '*** ENEMY LANDS ***
650 SOUND1,1:SOUND1,1:SOUND1,1:S
OUND1,1
660 HCOLOR0,0:HLINE(X,Y)-(X+28,Y
+17),PSET,BF:HLINE(X1,Y)-(X1+28,
Y+17),PSET,BF
670 Q=Q-1:IFQ=4THEN N=278:O=168
680 IFQ=3THEN N=239
690 IFQ=2THEN N=278:O=151
700 IFQ=1THEN N=239
710 IFQ=0THEN1610
720 HCOLOR0,0:HLINE(N,O)-(N+36,O
+12),PSET,BF
730 RETURN
740 '*** ENEMY EXPLOSION ***
750 HPUT(X,Y)-(X+28,Y+17),9:GOTO
770
760 HPUT(X1,Y)-(X1+28,Y+17),9
770 PLAY P$:PALETTE9,32:PLAY P$:
PALETTE12,38:PLAY P$:PALETTE12,0
:PLAY P$:PALETTE9,0
780 RETURN
790 '*** BONUS SUPER ZAPPER CHEC
K ***
800 IF M2=1 THEN RETURN
810 Z=Z+1:HCOLOR0,0:HLINE(249,10
3)-(279,111),PSET,BF:HCOLOR4,0:H
PRINT(31,13),Z
820 RETURN
830 '***BUFFERS AND COLORS***
840 HSCREEN2:HBUFF1,247:HBUFF2,2
47:HBUFF3,247:HBUFF4,270:HBUFF5,
270:HBUFF6,270:HBUFF7,270:HBUFF8
,270:HBUFF9,270
850 PALETTE0,0:PALETTE1,0:PALETT
E2,0:PALETTE3,0:PALETTE4,0:PALET
TE5,0:PALETTE6,0:PALETTE7,0:PALE
TTE8,0:PALETTE9,0:PALETTE10,0:PA
LETTE11,0:PALETTE12,0:PALETTE13,
0:PALETTE14,0:PALETTE15,0
860 HCLS0
870 '*** TANK /W GREY BACKGROUND
 ***
880 HCOLOR11,0:HLINE(20,10)-(57,
22),PSET,BF
890 HCOLOR 1,0:HLINE(28,19)-(49,
20),PSET,BF:HLINE(30,17)-(31,22)
,PSET,BF:HLINE(34,17)-(35,22),PS
ET,BF:HLINE(38,17)-(39,22),PSET,
BF:HLINE(42,17)-(43,22),PSET,BF:
HLINE(46,17)-(47,22),PSET,BF
900 HCOLOR8,0:HLINE(29,16)-(29,1
8),PSET:HLINE(30,15)-(47,16),PSE
T,BF:HLINE(32,17)-(33,18),PSET,B
F:HLINE(36,17)-(37,18),PSET,BF:H
LINE(40,17)-(41,18),PSET,BF:HLIN
E(44,17)-(45,18),PSET,BF:HLINE(4
8,16)-(48,18),PSET
910 HCOLOR6,0:HLINE(36,14)-(41,1
4),PSET:HLINE(38,10)-(39,13),PSE
T,B
920 HGET(20,10)-(56,22),1
930 '*** TANK /W BLACK BACKGROUN
D ***
940 HCOLOR1,0:HLINE(68,19)-(89,2
0),PSET,BF:HLINE(70,17)-(71,22),
PSET,BF:HLINE(74,17)-(75,22),PSE
T,BF:HLINE(78,17)-(79,22),PSET,B
F:HLINE(82,17)-(83,22),PSET,BF:H
LINE(86,17)-(87,22),PSET,BF
950 HCOLOR8,0:HLINE(69,16)-(69,1
8),PSET:HLINE(70,15)-(87,16),PSE
T,BF:HLINE(72,17)-(73,18),PSET,B
F:HLINE(76,17)-(77,18),PSET,BF:H
LINE(80,17)-(81,18),PSET,BF:HLIN
E(84,17)-(85,18),PSET,BF:HLINE(8
8,16)-(88,18),PSET
960 HCOLOR6,0:HLINE(76,14)-(81,1
4),PSET:HLINE(78,10)-(79,13),PSE
T,B
970 HGET(60,10)-(96,22),2
980 '*** BLANK TANK ***
990 HCOLOR11,0:HLINE(200,10)-(23
7,22),PSET,BF
1000 HGET(200,10)-(236,22),3
1010 '*** HELICOPTER DRAWING ***
1020 HCOLOR4,0:HLINE(248,6)-(248
,7),PSET:HLINE(244,8)-(251,8),PS
ET:HLINE(243,9)-(252,9),PSET:HLI
NE(242,10)-(263,10),PSET:HLINE(2
41,11)-(263,11),PSET:HLINE(241,1
2)-(253,12),PSET:HLINE(242,13)-(
252,13),PSET:HLINE(243,14)-(251,
14),PSET
1030 HCOLOR1,0:HLINE(245,15)-(24
5,16),PSET:HLINE(249,15)-(249,16
),PSET:HLINE(241,15)-(242,17),PS
ET:HLINE(242,17)-(257,17),PSET:H
LINE(245,9)-(246,11),PSET,B:HLIN
E(244,10)-(244,11),PSET:HSET(243
,11,1)
1040 HCOLOR13,0:HLINE(241,5)-(25
5,5),PSET:HLINE(266,7)-(266,11),
PSET
1050 HCOLOR14,0:HLINE(250,3)-(24
6,7),PSET:HLINE(264,8)-(268,10),
PSET
1060 HCOLOR15,0:HLINE(246,3)-(25
0,7),PSET:HLINE(264,10)-(268,8),
PSET
1070 HGET(240,0)-(268,17),4
1080 '*** GIANT FLY DRAWING ***
1090 HCOLOR1,0:HSET(281,8,1):HSE
T(288,8,1):HLINE(282,7)-(282,9),
PSET:HLINE(287,7)-(287,9),PSET:H
LINE(283,6)-(283,10),PSET:HLINE(
286,6)-(286,10),PSET:HLINE(284,6
)-(285,15),PSET,B:HLINE(282,13)-
(287,14),PSET,B:HLINE(283,15)-(2
83,17),PSET
1100 HLINE(286,15)-(286,17),PSET
1110 HSET(283,14,6):HSET(286,14,
6)
1120 HCOLOR13,0:HLINE(287,11)-(2
93,15),PSET:HLINE(287,11)-(293,1
4),PSET:HLINE(287,11)-(293,13),P
SET:HLINE(282,11)-(275,15),PSET:
HLINE(282,11)-(275,14),PSET:HLIN
E(282,11)-(275,13),PSET
1130 HCOLOR14,0:HLINE(287,11)-(2
93,12),PSET:HLINE(287,11)-(293,1
1),PSET:HLINE(287,11)-(293,10),P
SET:HLINE(282,11)-(275,12),PSET:
HLINE(282,11)-(275,11),PSET:HLIN
E(282,11)-(275,10),PSET
1140 HCOLOR15,0:HLINE(287,11)-(2
93,9),PSET:HLINE(287,11)-(293,8)
,PSET:HLINE(287,11)-(293,7),PSET
:HLINE(282,11)-(275,9),PSET:HLIN
E(282,11)-(275,8),PSET:HLINE(282
,11)-(275,7),PSET
1150 HGET(270,0)-(298,17),6
1160 '*** FIRE BALL DRAWING ***
1170 HCIRCLE(14,112),1,13:HCIRCL
E(14,112),4,13:HCIRCLE(14,112),2
,14:HCIRCLE(14,112),5,14:HCIRCLE
(14,112),3,15
1180 HGET(0,100)-(28,117),8
1190 '*** FLYING SAUCER DRAWING
***
1200 HCOLOR2,0:HLINE(109,8)-(120
,8),PSET:HLINE(108,9)-(121,9),PS
ET:HLINE(107,10)-(122,10),PSET
1210 HCOLOR4,0:HLINE(106,11)-(12
3,12),PSET,B:HLINE(106,16)-(123,
17),PSET,B
1220 HCOLOR13,0:HLINE(106,13)-(1
07,15),PSET,B:HLINE(112,13)-(113
,15),PSET,B:HLINE(118,13)-(119,1
5),PSET,B
1230 HCOLOR14,0:HLINE(108,13)-(1
09,15),PSET,B:HLINE(114,13)-(115
,15),PSET,B:HLINE(120,13)-(121,1
5),PSET,B
1240 HCOLOR15,0:HLINE(110,13)-(1
11,15),PSET,B:HLINE(116,13)-(117
,15),PSET,B:HLINE(122,13)-(123,1
5),PSET,B
1250 HGET (100,0)-(128,17),7
1260 '*** EXPLOSION DRAWING ***
1270 HCOLOR7,0:HLINE(148,8)-(157
,9),PSET,B:HLINE(152,5)-(153,12)
,PSET,B
1280 HCOLOR9,0:HLINE(150,3)-(155
,4),PSET,BF:HLINE(146,6)-(147,11
),PSET,BF:HLINE(150,13)-(155,14)
,PSET,BF:HLINE(158,6)-(159,11),P
SET,BF
1290 HLINE(148,5)-(151,7),PSET,B
F:HLINE(148,10)-(151,12),PSET,BF
:HLINE(154,10)-(157,12),PSET,BF:
HLINE(154,5)-(157,7),PSET,BF
1300 HSET(149,4,9):HSET(149,13,9
):HSET(156,4,9):HSET(156,13,9)
1310 HCOLOR12,0:HLINE(142,8)-(14
2,9),PSET:HLINE(143,6)-(143,11),
PSET:HLINE(144,4)-(145,13),PSET,
BF:HLINE(146,3)-(147,5),PSET,BF:
HLINE(146,12)-(147,14),PSET,BF:H
LINE(148,2)-(149,3),PSET,B:HLINE
(148,14)-(149,15),PSET,B:HSET(14
8,4,12):HSET(148,13,12)
1320 HLINE(152,0)-(153,0),PSET:H
LINE(150,1)-(155,2),PSET,B:HLINE
(150,15)-(155,16),PSET,B:HLINE(1
52,17)-(153,18),PSET
1330 HLINE(154,1)-(155,2),PSET,B
:HLINE(156,14)-(157,14),PSET,B:H
LINE(156,2)-(157,3),PSET,B:HLINE
(155,13)-(156,14),PSET,B:HLINE(1
58,3)-(159,5),PSET,B:HLINE(158,1
2)-(159,14),PSET,B:HLINE(160,4)-
(161,13),PSET,B:HLINE(162,6)-(16
2,11),PSET
1340 HLINE(163,8)-(163,9),PSET
1350 HGET(140,0)-(168,17),9
1360 '*** ROTATING BLADES DRAWIN
G ***
1370 HCOLOR13,0:HLINE(184,5)-(18
```

```
4,16),PSET:HLINE(185,5)-(183,16)
,PSET:HLINE(183,5)-(185,16),PSET
1380 HCOLOR14,0:HLINE(176,6)-(19
3,16),PSET:HLINE(176,7)-(193,15)
,PSET:HLINE(193,17)-(176,5),PSET
1390 HCOLOR15,0:HLINE(176,14)-(1
92,8),PSET:HLINE(175,13)-(192,9)
,PSET:HLINE(175,15)-(192,7),PSET
1400 HGET(170,0)-(198,17),5
1410 '*** SETUP FOR SCREEN ***
1420 HCLS
1430 HCOLOR2,0:HLINE(317,0)-(236
,192),PSET,B
1440 HCOLOR6,0:HPRINT(31,2),"SCO
RE"
1450 HCOLOR6,0:HPRINT(31,5),"HI
SCORE"
1460 HPRINT(30,17),"NO. SHIPS"
1470 HPRINT(31,8),"MISSES"
1480 HCOLOR6,0:HPRINT(31,11),"SU
PER"
1490 HPRINT(31,12),"SAVERS"
1500 HCOLOR11,0:L=175
1510 FOR K=0 TO 235
1520 N=RND(2):IF N=1 THEN L=L+1
ELSE L=L-1
1530 IF L>178 THEN L=178
1540 IF L<156 THEN L=156
1550 HSET(K,L)
1560 NEXT K
1570 HLINE(235,L)-(235,191),PSET
1580 HPAINT (100,189),11,11
1590 GOTO1640
1600 '*** END OF GAME ***
1610 HPUT(A1,179)-(A1+36,191),3,
PSET
1620 HCOLOR0,0:HLINE(X,Y)-(X+28,
Y+17),PSET,BF:HLINE(X1,Y)-(X1+28
,Y+17),PSET,BF
1630 ' *** START UP ***
1640 PALETTE0,0:PALETTE1,8:PALET
TE2,9:PALETTE3,47:PALETTE4,18:PA
LETTE5,18:PALETTE6,36:PALETTE7,5
5:PALETTE8,40:PALETTE9,0:PALETTE
10,55:PALETTE11,56:PALETTE12,0:P
ALETTE13,40:PALETTE14,0:PALETTE1
5,0
1650 PLAY "T3L602B-03L12CP90CP90
CP90CP90CP90CL8E-P90E-P90L12E-P9
0E-CP90CP90CP90CP90CP50CL802B-P9
0B-P90L12B-P90B-03CP90CP90CP90CP
90CP90CL6E-F02B-03CO2L55BAGFEDCO
1BAGFEDC"
1660 HCOLOR5,0:HPRINT(10,1),"MEG
A TANK":HPRINT(3,17),"PRESS ANY
KEY TO BEGIN"
1670 H=0:RESTORE
1680 FOR F=0TO4
1690 HCOLOR0,0:HLINE(7,103)-(87,
93),PSET,BF:HLINE(167,103)-(220,
93),PSET,BF
1700 READ M$,M,U,V,W
1710 HCOLOR6,0:HPRINT(1,12),M$
1720 HPRINT(22,12),M
1730 HPUT(110,86)-(138,103),U
1740 FOR PP=1TO25
1750 FOR XY=1TO40:NEXTXY
1760 H=H+1:IFH=1THENPALETTE13,W:
PALETTE14,V
1770 IFH=2THENPALETTE14,W:PALETT
E15,V
1780 IFH=3THENPALETTE15,W:PALETT
E13,V:H=0
1790 P=RND(63):PALETTE5,P
1800 A$=INKEY$:IF A$<>""THENGOTO
1840
1810 NEXT PP
1820 NEXT F
1830 GOTO1670
1840 HCOLOR0,0:HLINE(77,6)-(152,
15),PSET,BF
1850 HLINE(7,103)-(87,93),PSET,B
F
1860 HLINE(110,86)-(138,104),PSE
T,BF
1870 HLINE(167,103)-(220,93),PSE
T,BF
1880 HLINE(15,132)-(210,146),PSE
T,BF
1890 HCOLOR0,0:HLINE(249,103)-(2
79,111),PSET,BF:HLINE(249,71)-(2
79,79),PSET,BF
1900 M1=0:HCOLOR4,0:HPRINT(31,9)
,M1
1910 Z=2:HPRINT(31,13),Z
1920 S=0:A1=100:J=0:Q=5:R=3:T=10
0:U=4:V=36:W=0:I1=0
1930 HPUT(239,151)-(275,163),2,P
SET:HPUT(239,168)-(275,180),2,PS
ET:HPUT(278,151)-(314,163),2,PSE
T:HPUT(278,168)-(314,180),2,PSET
1940 GOSUB440:GOSUB600
1950 GOTO100
1960 DATA CHOPPERS,100,4,36,0,BL
ADES,250,5,38,0,BATS,500,6,36,0,
SAUCERS,1000,7,36,63,FIREBALLS,1
500,8,55,32
1970 RGB:POKE 65496,0
```


JWT Enterprises

Attention! MM1 programmers wanted. Many prospective projects already planned. Write for more information.

Optimize Utility Set 1 *NEW!*

Optimize your disks by eliminating fragmented files and compacting your directories for faster file access. Also includes a utility to assess file fragmentation and directory fragmentation as well as excess directory padding.

Optimize Utility Set 1 $29.95 Foreign postage, add $3.00

Nine-Times: Each issue contains: 9 helpful and useful programs to help build your OS-9 library * Instructions, examples, and samples of Basic09 procedures and subroutines to help with your own programs and your understanding of Basic09 * C programs and programming examples * Hints, Help columns, and informative articles to advance your knowledge of OS-9 * Supplied totally of 5.25" disk * Bound manual sent to each new subscriber for help in getting *Nine-Times* up and running, as well as tips on using it with a ram disk or hard disk * All graphic/joystick interface for ease of use.

1-Year Subs, $34.95 Foreign postage, add $8.00

Back Issues: Available for the *May 1989* through *May 1991* issues. Please write for information on Back Issue contents.

Back Issue, ea. $7.00 Foreign postage, add $2.00 ea.

Magazine Source: Due to many inquiries, the source code for the magazine graphic shell is being provided as an informational tool. Included is the actual Basic09 source code and compiled modules on disk, as well as documentation and a printed copy of the source code.

Source, $25.95 Foreign postage, add $5.00

Foreign postage excludes U.S. Territories and Canada. New rates eff. May 31, 1991

To order, please send U.S. check or money order to:

JWT Enterprises
5755 Lockwood Blvd.
Youngstown, OH 44512

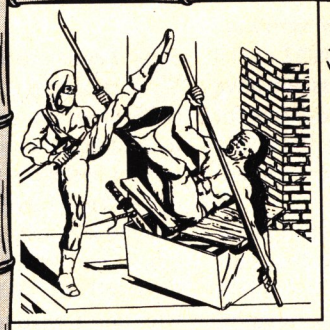
Technical Assistance: (216)-758-7694

All products for Level 2 OS-9

RAINBOW CERTIFICATION SEAL

Sorry, no C.O.D.'s or credit cards; Foreign & Canadian orders, *please* use **U.S. money orders.** U.S. checks, allow 3-4 weeks for receipt of first issue/back issue.

Copyright (C) 1991 OS-9 is a trademark of Microware Systems Corp. and Motorola, Inc.



KYUM-GAI TO BE NINJA

OS-9

Kyum-Gai: to be Ninja (OS-9 Version) is the culmination of a project started almost a year ago. The talents of *Glen R. Dahlgren* (RS-DOS game writer for Sundog Systems), *Kevin Darling* (a legend for his work in OS-9), and *Eddie Kuns* (author of KBCom) have been pooled to create a masterpiece of game software under the OS-9 operating system. Fast martial arts action with outstanding graphics, great digitized sound effects, and incredible animation are featured in this arcade game, all in the OS-9 environment.

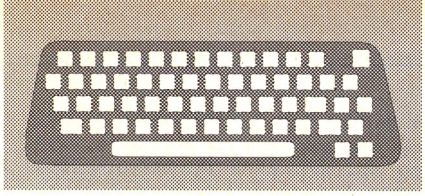
Always wanted to play the great CoCo 3 games but didn't want to sacrifice your OS-9 features? ***Multitask while playing*** Kyum-Gai. ***Have multiple Kyum-Gai's*** running in memory. Don't worry about switching windows, because Kyum-Gai: OS-9 auto-pauses, to wait for your return.

Put simply, this is an unprecedented piece of software for the CoCo; a landmark game sure to be a major part of the Color Computer history. Don't miss out on this game! Req. 512K CoCo III with OS-9 Level 2 and joystick. **$29.95**

VISA, Mastercard, Money Order, and COD (USA only, please) accepted. All foreign orders must be sent in US currency Money Orders. Include $2.50 for shipping in USA and Canada, $5.00 Foreign. $3.00 extra for COD orders. VA residents please add 6% sales tax. Dealer inquiries welcome. Authors: we're looking for new software!

Sundog systems

P.O. Box 766
Manassas, VA 22111
(703) 330-8989



OS-9 Hotline

Down to Business

THE RAINBOW Staff

? *I recently took my CoCo 3 and dual disk drive to work and use it to track inventory and maintain accounts receivable. The programs I am using are* Data Master, Dynacalc *and* DynaStar. *I realize I need a hard drive to speed my work, but right now I wonder if there are any business programs out there for Level II on the CoCo 3. What software do other people use?*

R. Bryan Pratt
A-L Machine & Assoc.
P.O. Box 21222
Roanoke, VA 24018

a We know of no "business" software designed specifically for OS-9 Level II on the CoCo 3. However, as you have found, most general packages work fine for most small-business applications. Basically all you need is a word processor, a spreadsheet and a database.

We did a quick check of *The OS-9 Sourcebook* from Microware (get a copy for yourself — you'll see a lot of things you might not otherwise expect). Three companies listed that carry business software for OS-9/6809 are:

South East Media
5900 Cassandra Smith Rd.
Hixson, TN 37343
(615) 842-4600

Specialty Electronics, Inc.
909 North Cleveland
Enid, OK 73703
(405) 233-1632

Trend Computer Systems
828-A Dodsworth Ave.
Covina, CA 91724
(818) 331-4114

Yes, you'll find a hard drive more than helpful when working with OS-9. In the meantime, perhaps other readers will let you know what software they use for business purposes.

A Graphical Point of View

? *A friend gave me several Disk BASIC disks filled with graphics files. The problem is that I use OS-9 most of the time. I can transfer the files to OS-9 disks, but I have no way to look at them under OS-9. Any suggestions?*

Marty Goldstein
Chicago

a Thanks to Tim Kientzle, we have an excellent solution. Tim has written a program called *View* that lets you look at graphics images in most any CoCo format or the GIF format. The latest version of this OS-9 Level II shareware program is 4.3, and it is available in the OS9 Online database on Delphi. The graphics files must be stored on OS-9-formatted disks. For those who don't have access to Delphi, we contacted Tim and he gave us permission to supply *View 4.3* on this month's RAINBOW ON DISK. We'll include a few graphics samples from CoCo Gallery, too. You can get many more images, though, from the Delphi CoCo and OS-9 Online SIGS.

Getting Into *Multi-Vue* & BASIC09

? *I have a couple of problems I hope you can solve for me. First, I am having trouble adjusting my recently purchased copy of* Multi-Vue *for 512K. Everything goes fine until Step 4 on Page 1-6 of the* Multi-Vue *manual. Then the process fails. What am I doing wrong? The second problem I am having is getting BASIC09 running. Most frustrating of all is that I did it once. The manual instructs me to simply enter* `basic09`, *but this doesn't work. Help!*

Kris Petterson
Maidstone, Saskatchewan
Canada

a We can help. The *Multi-Vue* manual has a couple of blurbs that make it difficult for beginning users. Step 4 on Page 1-6 of that manual should read

```
edit /d0/sys/env.file
```

Note the space after `edit`. The line above is a two-part command line. The first part, `edit`, tells the computer you want to edit a file. The rest of the line is the *pathlist*, your way of telling OS-9 the name of the file you want to edit, along with the drive and directory where that file can be found. The space between the two parts is required. It's in the manual, too, but the typestyle makes it hard to see. The real goof is that Tandy misprinted the lowercase letter o for the number 0 in the first part of the pathlist. We don't know too many people who have a Drive `/do`.

Another error in the *Multi-Vue* manual appears on Page 1-7, also in Step 4. Since Drive 0 is a *device*, there should be a slash in front of the pathlist. Step 4 should read

```
chx /d0/cmds
```

BASIC09 is located in the `CMDS` directory of the Boot/Config/BASIC09 disk included with the OS-9 Level II package. To get it running, put a backup of that disk in Drive `/d0` and enter

```
chd /d0
chx /d0/cmds
```

Without T&D your Coco is a Barebone System

ISSUE #95, MAY 1990
DREAMTIME ADV.
XT/AT SYSTEMS
BIBLE QUIZ 2
16 FLAGS
FRACTIONS
SOLITAIRE PUZZLE 4
512K RAM DRIVE 3
FOOD FACTORY 3
WHO PART 2
TRAPEALL

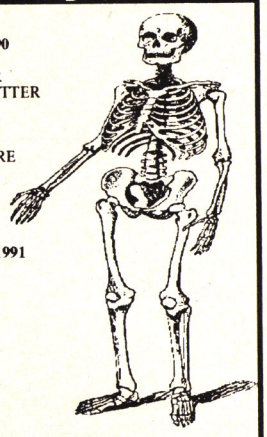
ISSUE #96, JUNE 1990
ENTREPENEUR
DR. PHRED!
PRINTER FONT CODES
BIBLE QUESTIONS PT. 3
CALO ADVENTURE
FORM MAKER
DRAGON ESCAPE
PLANE EXPLORER
WHO PART 3
MS. MAZE

ISSUE #97, JULY 1990
FCC EXAM HELPER
EMPLOYEE SCHEDULE
FLYING SAUCER ADV.
SPEECH AID
MOWER MADNESS
JET TRIVIA
INSTANT CALENDAR
WORLD MASTER 3
AIR WAR 3
SKRAMBLE

ISSUE #98, AUGUST 1990
FLIPPY TUTORIAL
RECIPE/MEAL/GROCERY
DUNGEON MAZE
SNOW SKI
HOT LOAD
SHIP WAR
ERROR TRAP
SPACE WAR 3
MAZE MASTER 3
WIZARD'S DEN

ISSUE #99, SEPT., 1990
IDEA TREE
MASTER'S LABYRINTH
MORSE CODE
TELESALE CONTACTS
PROMISED LAND QUIZ
PROPOSAL WRITER
ALPHABET SCRAMBLE 3
MAGIC PUMPKIN
DR. WHO3 PART 4
FANGMAN

ISSUE #100, OCT. 1990
ZOT MIND GAME
SUPER TEXT EDITOR
SUPER TEXT FORMATTER
TURTLE SEARCH 3
COAST TO COAST
EASY BASIC 3
DRAGON ADVENTURE
WRITE OUT UTILITY
TRY THIS
DONUT DILEMMA



ISSUE #101, NOV. 1990
GOSSIP
COST ESTIMATOR
SALO INVENTORY
PERSONAL STATS
ALAIX - 3
DEATH HUNT
512K RAM CAT. 3
Bingo Caller 3
DUCK HUNT
THE FROG

ISSUE #102, DEC. 1990
REAL ESTATE ANALYSIS
COCO PAYROLL
DR. STRANGE ADV.
TANNING SALON
TREASURE HUNT
RIVERBOAT BLACKJACK
TURTLE RACE 3
SUPER SCREEN DUMP
KEYBOARD REMAP
CRASH

ISSUE #103, JAN. 1991
FAMOUS PEOPLE
LABRYNTH 3
DATA ANALYSIS
MEDICAL FILE
WORD GENERATOR 3
PRIVATE EYE ADVENTURE
HEARTS 3
COCO JOKESTER
TETRAPAK 3
ELECTRON

ISSUE #104, FEB. 1991
WINE CELLAR
BOMB RUN
SPLIT/APPEND FILES
INITIALIZE 35 +
PIG OUT
ERYPTOGRAM 3
GHOST HUNTER
HI-COPY
LEARN!
SR-71

ISSUE #105, MARCH 1991
ROBOCROOK
CREDIT CARD ACCT.
ABC'S ' 123'S
ANTIQUE COLLECTOR
FOUR SCORE
QUICK TAX
HI-LOAD
QUAD EDUCATION 3
SMURF QUEST 3
BUZZWORM

ISSUE #106, APRIL, 1991
STOCK PORTFOLIO
THE BARREL
SERVICE MANAGER
CROSUMS PUZZLE
DIAMOND QUEST
JOB SKILLS
JOB APPLICANT
ELDUS 3
BREAK-IN3 PART 2
KATERPILLAR II

Last 12 issues shown here!

Tom Mix arcade games.

RAINBOW CERTIFICATION SEAL

Don't waste a minute!
Check out all our public domain issues.

RAINBOW CERTIFICATION SEAL

Music 1-7
M1 - 8 Utilities & 8 Songs
M2 - 17 Musica Files
M3 - 16 Musica Files
M4 - 16 Musica Files
M5 - 25 Orchestra Files
M6 - 23 . Bin Files ready to play
M7 - 23 .Bin Files ready to play

Graphics 1-14
GR1 - Atlanta, Cube, Space +
GR2 - Objects, Wargame, Worldmap, +
GR3 - 9 Coco 3 Graphic programs.
GR4 - 22 Coco Max Pictures
GR5 - 22 Coco Max Pictures
GR6 - 22 Coco Max Pictures
GR7 - 15 Coco Max Pictures
GR8 - 22 .BIN Pictures
GR9 - 22 .BIN Pictures
GR10 - 14 Large .BIN Pictures
GR11 - 8 MGE Pictures
GR12 - Coco Max 3 Pictures
GR13 - Macpaint Graphic Editor
GR14 - 5 Macintosh Pictures

Adventures 1,2
A1 - CIA, Death Ship, Gargoyle, Kingdom, Kingtut
- Odeysey, Nuclear Sub, Werewand, Willsadv
A2 - Andrea Doria, Curse, Ghostship, Hogjowl
- Icewar, Quest, Sorcerer, Survival, Adv. Gen.

Telecommunications 1-3
T1 - Haysae, Kermit, Mikeyterm, Teleterm
T2 - Cobbs BBs Terminal Package
T3 - Geterm Communications

Education 1-4
E1 - 12 Programs for young kids.
E2 - 12 Programs for High School Kids
E3 - 11 Programs Teach the Coco's Commands
E4 - 5 Graphic Programs About Australia

HOME MANAGEMENT 1-4
*12 Programs Each Disk/Tape
H1 - Calendar, Financial Advise, Typing Tutor, +
H2 - Check, Last Will, Word Processor, +
H3 - Envelope, Finance, Interest Rate, +
H4 - Speeling Fix, Spelling Checker, +

Utitlites 1-8
12 Programs Each, U1-U4 Require Disk
U1 - Dir32, Disk Zapper, Rom Copy, Snap, +
U2 - Backup, Disktest, Label, Offset, +
U3 - Convert, Disk Library, Play Mac, Relocate, +
U4 - Bin>Basic, Disk Master, Unarc, Unlock, +
U5 - Assembler, Basic 64, Database, Recover, +
U6 - 64 Look, HGR Color, LLIST 32, Tape Type, +
U7 - Letter head print with 30 mini pictures
U8 - Fig Forth language with tutorials!

GAMES 1-11
*Each Disk/Tape Contains 12 Programs *
GA1 - Blackbox, Car race, Horses, Startrek +
GA2 - Chess, Rider, Rubic, Vapor worm, +
GA3 - Backgammon, Gremlin, Poker, Robots, +
GA4 -Hawks, Lunar World, Saucer, Shootem, +
GA5 - Battleship, Chicken, Raceway, Squash, +
GA6 - Kings Army, Navyguns, Shipsub, Tanks, +
GA7 - Connect 4, F-16, Pizza, Rubic, +
GA8 - Football, Germ Attack, Othello, Slither, +
GA9 - Battle, Flight, Max Graphics, Prix, +
GA10 - Blockade, Life, Missile2, Scramble, +
GA11 - Bunker 3, Guadal, Nuke Attack, Traders, +

Mail To:

T&D Subscription Software
2490 Miles Standish Drive
Holland MI 49424
(616) 399-9648
Fax: (616) 396-2744

VISA

Prices:

master charge

Single Issue (Tape or Disk)...	$ 8.00
2-5 ISSUES.....	$ 6.00 Ea.
6-10 Issues.....	$ 5.00 Ea.
11 or more Issues.....	$ 4.50 Ea.
All our software (189 disks).....	$ 279.00
One year subscription.....	$ 60.00

*All issues conatain 6-15 ready to run programs on disk or tape.
*Original software includes documentation.
*We send first class! No charge.
*Personal checks welcome.
*Write for a free catalog.
*Programs are for Coco 1,2 or 3.

Original Software

1	16	31	46	61	76	91	106
2	17	32	47	62	77	92	
3	18	33	48	63	78	93	
4	19	34	49	64	79	94	
5	20	35	50	65	80	95	
6	21	36	51	66	81	96	
7	22	37	52	67	82	97	
8	23	38	53	68	83	98	
9	24	39	54	69	84	99	
10	25	40	55	70	85	100	
11	26	41	56	71	86	101	
12	27	42	57	72	87	102	
13	28	43	58	73	88	103	
14	29	44	59	74	89	104	
15	30	45	60	75	90	105	

Public Domain

M1	GR1	E1	U1	GA1
M2	GR2	E2	U2	GA2
M3	GR3	E3	U3	GA3
M4	GR4	E4	U4	GA4
M5	GR5		U5	GA5
M6	GR6	H1	U6	GA6
M7	GR7	H2	U7	GA7
	GR8	H3	U8	GA8
A1	GR9	H4		GA9
A2	GR10			GA10
	GR11			GA11
T1	GR12			
T2	GR13			
T3	GR14			

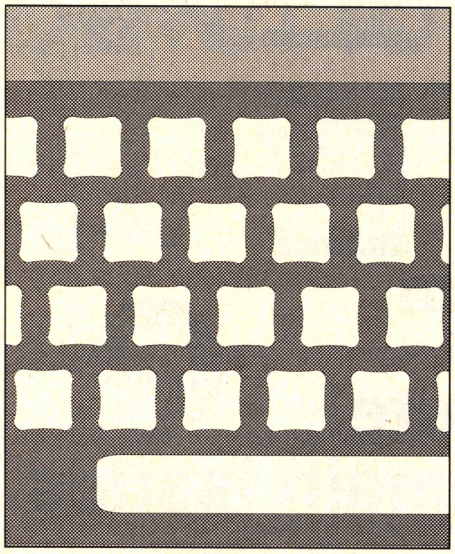
Name _____
Address _____
City _____ State ____ Zip ____
Credit Card # _____
Expiration _____ Total $ _____

Please Circle : TAPE or DISK

If you have two drives, leave your System Master (backup) in Drive /d0 and put the BASIC09 disk in Drive /d1. Then enter

```
chd /d1
chx /d1/cmds
```

At this point you can enter basic09. It should load from disk and start running.



To better understand your difficulties getting BASIC09 going, you'll need to bone up on OS-9's hierarchical directory structure. We strongly recommend you read "OS-9: Catch the Wave" (January 1988, Page 166). Also read all you can about pathlists and the chd and chx commands.

OS-9 Guide Troubles

?

There seems to be a problem with the procedures EnglishScreen, MakeScreens *and* Translate *beginning on Page 54 of* The Complete Rainbow Guide To OS-9 Level II. *When I entered*

```
edit #44K MakeScreens <Translate
```

as instructed on Page 58, the message MACRO OPEN *appeared. When I later entered* dir, *I found a file named* SCRATCH *that disrupted the editor. I can delete* SCRATCH, *but it keeps reappearing. The problem is getting rid of it permanently so it doesn't interfere with* edit. *Adding the missing lines to* EnglishScreen *doesn't work.*

Harold D. Clark
Salem, Oregon

a

When you enter edit along with the name of a file that already exists, the edit command creates a file called SCRATCH. (Speaking of *scratch*, our heads got a lot of that while trying to duplicate your problem.) This file holds part (or all) of the original text file and the changes you make. When you exit the editor, the original file is deleted and SCRATCH is renamed with the original filename — that is, unless something bombs the edit command, in which case SCRATCH is left on the disk. We encourage you to read Page 7-5 in the "OS-9 Commands" section of the Level II manual. SCRATCH is a "normal" file and is not interfering with edit. So let's look at why the editor bombed.

When you use edit, you *must* press the space bar as the first character on any line of text you want in the file. But these spaces don't appear in the final text file. They are used by the editor so it knows whether you are entering a command or a line of text. Our guess is that when you created Translate, you entered at least one line without pressing the space bar first, and edit executed the line immediately as a command *without* storing it in the file. You did this with either all the lines or just the last one, which contains the q (Quit) command. If you list your Translate file, you'll find it is empty, or that the last line doesn't have the single letter q on it.

This would be fine if Translate were just going to be used as a text file — you could just edit again and correct it. But in this case, the edit command on Page 58 of our book is using Translate as a list of editor commands that are intended to alter MakeScreens. As explained in the book (please reread that section *very* carefully), these commands are executed automatically so you don't have to enter them from the keyboard. The actual text lines in Translate are not intended to appear in MakeScreens or EnglishScreen.

So edit knows its instructions are coming from Translate. It sets up Translate as an internal macro and opens it. But when it gets to the end of the file, it doesn't see a q, which would tell it to quit. Rather, it sees an EOF (end-of-file) character. Unfortunately edit cannot exit if a macro (such as Translate) is open — edit can't quit of it's own accord. So the system locks up and you have to reboot. When you do, you see SCRATCH in the directory because the editor never got to the part where it renames the file. It's a good thing, too, or you'd have an empty file. The solution is to edit Translate and make sure all its lines are there.

General Assembly

?

On Page 3-2 of the "OS-9 Commands" section in the Level II manual is a shell command that calls the assembler. I can't get the command to work, but I'm a fairly new OS-9 user. I called THE RAINBOW and heard that BASIC09 had taken place of asm *in the Level II package. If* asm *is a legal command, I need to know how to call it from the shell.*

Robert D. Cook
Medley, Florida

a

OS-9 Level II does *not* include an assembler. Instead, BASIC09 is provided with the package. OS-9 Level I comes with asm, the assembler to which you refer, and BASIC09 was sold separately. The Level II assembler, called *RMA*, comes in the *Development System*. The command line on Page 3-2 in the Level II manual is given solely as an example of how OS-9 command lines work. It is not intended as a sample of how to call the (nonexistent) asm assembler.

If you also have OS-9 Level I, you can use asm with its definitions (provided in the DEFS directory of the Level I disk) under Level II. Be aware that direct-page variables are different between Level I and Level II. Also, OS-9 Level II provides system calls and error codes that are not included in the Level I defs files, especially for the windowing functions.

Level I and the CoCo 3

?

About a year ago, a friend switched to another machine and gave a lot of his CoCo software to me. Included were OS-9 (Version 1.01.00) and the C Compiler— *I got the original packages complete with manuals. I want to learn to use OS-9, and I have both a CoCo 2 and a CoCo 3. Does OS-9 work on the CoCo 3?*

Charles Rempel
Plum Coulee, Manitoba
Canada

a

What you received is OS-9 Level I, of which there are three versions: 1.00, 1.01 and 2.00. Versions 1.00 and 1.01 do *not* work with the CoCo 3. Version 2.00 does work on the CoCo 3 and was offered as an upgrade, but it is no longer available. You can go ahead and use the version you have with your CoCo 2. If you want to use OS-9 on the CoCo 3, you'll have to get OS-9 Level II from Tandy. If you can't find it in a local store, try Tandy's Express Order System at (800) 321-3133.

Your questions regarding OS-9 are welcome. Please address them to OS-9 Hotline, THE RAINBOW, P.O. Box 385, Prospect, KY 40059.

We reserve the right to publish only questions of general interest and to edit for brevity and clarity. Due to the large volume of mail we receive, we are unable to answer letters individually.

Questions can also be sent to us through the Delphi CoCo SIG. From the CoCo SIG> prompt, pick Rainbow Magazine Services. Then at the RAINBOW> prompt, type ASK (for Ask the Experts) to arrive at the EXPERTS> prompt, where you can select the OS-9 Hotline online form.

The Assembly Line

Macro-May

by William P. Nee

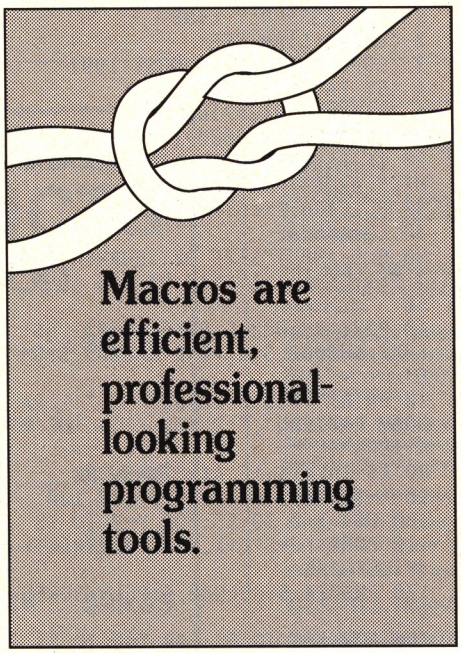
Programmers are always looking for ways to streamline program production, and "Assembly Line" is a good source of new ideas. This time we're going to examine programming macros, and I'll introduce a looping technique I loosely refer to as *recursive programming*. I addressed macros in my last article, but they're certainly deserving of a closer look.

Macros are a lot like subroutines but with the following differences: Macros can be saved by themselves or as part of a macro file; they are added to the program each time they are called, eliminating the BSR command but using more memory; and values, strings, or memory locations can be passed directly to a macro as part of a call.

Macros are efficient, professional-looking programming tools. Unfortunately, macros are not supported by the Tandy *EDTASM+* cartridge. You'll need *Color Disk EDTASM+* to use them.

Listing 3 starts off with two macros. Line 100 defines the name of the first macro as LOCATE and states that this is indeed a macro. The next line means Register A is to be loaded with the second value passed to the macro when it is called in the program. A macro call has the following format:

macroname value0, value1, value2, . . .



Remember, the values passed can be any combination of numbers or strings, or they can even be memory locations. Line 640 is the first call. It is to the macro LOCATE and passes the contents of memory locations X3, Y3 and SIZE as values 0, 1 and 2. The macro multiplies Value 1 and Value 2 then adds Value 0 to that result. Values are indicated within the macro by a backslash (\) (SHIFT/CLEAR keys) followed by 0 through 9. If you have more than ten values to pass, you can use A through Z after 0 through 9.

Loops within the macro also use the backslash, followed by a period and the letters A through Z. Each macro ends with ENDM. If you have a file of macros, you can add them to your program in one of two ways: You can insert INCLUDE MACRONAME near the start of the program for each macro used, which forces the disk to run and find that macro every time you test your program. Or you can load an entire macro file, delete the ones you won't use and then start your program. You can eliminate unnecessary lines in the macro by starting that line with an asterisk (*) — the equivalent of REM in BASIC — which I did in Line 300 since I could include the same information as part of the program. Doing this won't add the line every time the macro is called, therefore saving memory and increasing speed. I like to save macros without adding an extension (*EDTASM+* will add one) so I can distinguish between macros and source code.

Be sure to include the macros as part of the source code in any written program or no one will know what the macro does when it's called unless they can disassemble the program from *ZBUG*. There are seven macros defined in the Tandy *Color Disk EDTASM+* manual. These macros are shown on (unnumbered) Page 139, and they were the start of my macro file. If you have a very, very long macro that is going to be used several times in your program, you may be better off adding it as a subroutine and branching to it rather than using all the memory required by repeated calls.

Again and Again

Listing 1 is a BASIC program that draws

Bill Nee bucked the snowbird trend by retiring to Wisconsin from a banking career in Florida. The success of his 13-part series, "Machine Language Made BASIC" (July 1988 to July 1989), prompted him to continue writing articles about Color Computer machine-language programming. You may contact Bill at Route 2, Box 216C, Mason, WI 54856-9302. Please include an SASE when requesting a reply.

Reviewer Information

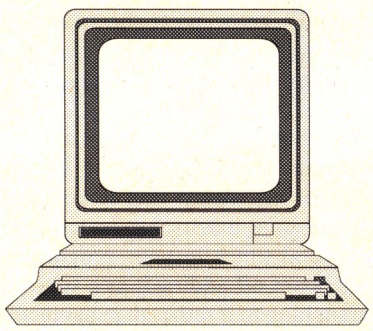
In order to continue to bring Tandy Color Computer users all the best information about new hardware and software products each month, we are constantly looking for new people to join our independent review staff. Therefore, we invite you to join THE RAINBOW's elite fleet of reviewers.

You read THE RAINBOW because you love your Color Computer, so if you want a creative outlet and a chance to examine quality hardware and software, with your observations published nationwide, we want to hear from you.

Send us a cover letter with your name, address, occupation, list of equipment, areas of general interests, and a sample review of a CoCo product you are currently using. We look forward to your response. After all, we already see you have the best taste in computers.

Reply to:

Reviews Editor
The Rainbow
The Falsoft Building
P.O. Box 385
Prospect, KY 40059



64K Disk

Listing 1: ENLARGE1

```
1 'THE ASSEMBLY LINE
2 'BY WILLIAM NEE
3 'COPYRIGHT (C) AUGUST 1991
4 'BY FALSOFT, INC.
5 'RAINBOW MAGAZINE
10 S=3:S4=S*S*S*S:S3=S*S*S:S2=S*
S
20 SS=S-1
30 DIM S(SS,SS)
40 FOR X=0 TO SS:FOR Y=0 TO SS
50 S(X,Y)=1:NEXT Y,X:S(2,1)=0:S(
1,2)=0:S(2,2)=0
60 'S(X,Y)=1:NEXT Y,X:S(1,1)=0
70 PMODE4,1:COLOR0,5:PCLS:SCREEN
1,1
80 FOR X4=0 TO SS
90 FOR Y4=0 TO SS
100 IF S(X4,Y4)=1 THEN GOSUB 130
110 NEXT Y4,X4
120 GOTO 120
130 FOR X3=0 TO SS
140 FOR Y3=0 TO SS
150 IF S(X3,Y3)=1 THEN GOSUB 170
160 NEXT Y3,X3:RETURN
170 FOR X2=0 TO SS
180 FOR Y2=0 TO SS
190 IF S(X2,Y2)=1 THEN GOSUB 210
200 NEXT Y2,X2:RETURN
210 FOR X1=0 TO SS
220 FOR Y1=0 TO SS
230 IF S(X1,Y1)=1 THEN GOSUB 250
240 NEXT Y1,X1:RETURN
250 FOR X0=0 TO SS
260 FOR Y0=0 TO SS
270 IF S(X0,Y0)=0 THEN 310
280 XX=S4*X4+S3*X3+S2*X2+S*X1+X0
290 YY=S4*Y4+S3*Y3+S2*Y2+S*Y1+Y0
:IF YY>191 THEN 310
300 PSET(XX,YY)
310 NEXT Y0,X0:RETURN
```

Listing 2: ENLARGE2

```
1 'THE ASSEMBLY LINE
2 'BY WILLIAM NEE
3 'COPYRIGHT (C) AUGUST 1991
4 'BY FALSOFT, INC.
5 'RAINBOW MAGAZINE
10 CLEAR200,&H6000-1
20 IF PEEK(&H6015)<>16 THEN LOAD
M"ENLARGE":POKE&HFF40,0
30 PCLEAR8:L=16:FB=&HFF00
40 LO=&H62AE
50 CLS:INPUT"SIZE OF SQUARE [3-6
] ";S:SS=S-1:IF S<3 OR S>6 THEN
50
60 POKE &H6000,S:POKE &H6001,SS:
POKE &H6002,S*S:POKE &H6003,S*S*
S
70 PRINT"THIS WILL BE -",," 1.RA
NDOM PATTERN"," 2.YOU PICK THE P
ATTERN"
80 A$=INKEY$:IF A$=""THEN 80
90 A=VAL(A$):ON A GOTO 100,120
100 FOR X=0 TO SS:FOR Y=0 TO SS
110 POKE LO+S*Y+X,RND(2)-1:NEXTY
,X:GOTO260
120 PMODE4,5:COLOR0,5:PCLS:SCREE
N1,1
130 FOR X=0 TO SS:FOR Y=0 TO SS
140 POKE LO+S*Y+X,1:LINE(X*L,Y*L
)-(X*L+L,Y*L+L),PSET,B:NEXT Y,X
150 X=JOYSTK(0):Y=JOYSTK(1)
160 XX=INT(X/4):YY=INT(Y/4):IF X
X>SS OR YY>SS THEN 150
170 LINE(XX*L,YY*L)-(XX*L+L,YY*L
+L),PRESET,B:LINE(XX*L,YY*L)-(XX
*L+L,YY*L+L),PSET,B:IF PEEK(FB)=
254 OR PEEK(FB)=126 THEN  350
180 A$=INKEY$:IF A$=CHR$(13) THE
N 190 ELSE 150
190 X0=XX:Y0=YY:CLS
200 PRINT"WHICH DIRECTION?"," 1.
FROM THE CORNERS IN"," 2.FROM TH
E CENTER OUT"," 3.REGULAR PATTER
N"
210 D$=INKEY$:IF D$=""THEN 210
220 D=VAL(D$):IF D<1 OR D>3 THEN
  210 ELSE POKE &H6004,D
230 PMODE4,1:COLOR0,5:PCLS:SCREE
N1,1
240 EXEC &H6015
250 A$=INKEY$:IF A$=""THEN 250 E
LSE 390
260 PMODE4,5:COLOR0,5:PCLS:SCREE
N1,1
270 FOR X=0 TO SS:FOR Y=0 TO SS
280 IF PEEK(LO+S*Y+X)=1 THEN LIN
E(X*L,Y*L)-(X*L+L,Y*L+L),PSET,B
290 IF PEEK(LO+S*Y+X)=0 THEN LIN
E(X*L,Y*L)-(X*L+L,Y*L+L),PSET,BF
300 NEXT Y,X
310 A$=INKEY$:IF A$="" THEN 310
320 IF A$="^" THEN 100
330 IF A$=CHR$(13) THEN 190
340 GOTO 310
350 V=PPOINT(XX*L+L/2,YY*L+L/2)
360 IF V=5 THEN LINE(XX*L,YY*L)-
(XX*L+L,YY*L+L),PSET,BF:POKE LO+
S*YY+XX,0
370 IF V=0 THEN LINE(XX*L,YY*L)-
(XX*L+L,YY*L+L),PRESET,BF:POKE L
O+S*YY+XX,1
380 GOTO180
390 CLS:PRINT
400 PRINT"1.REFORMAT THIS SQUARE
","2.BACK TO MAIN MENU"
410 A$=INKEY$:IF A$="" THEN 410
420 A=VAL(A$):ON A GOTO 440,470
430 GOTO 410
440 PMODE4,5:COLOR0,5:SCREEN1,1
450 XX=X0:YY=Y0
460 GOTO 150
470 GOTO 50
```

Listing 3: ENLARGE.ASM

```
00100 LOCATE  MACRO
00110         LDA     \1        2D VALUE
00120         LDB     \2        3D VALUE
00130         MUL
00140         ADDB    \0        1ST VALUE
00150         ENDM
00160
00170 PSET    MACRO
00180         LDA     \1
00190         LDB     #32
00200         MUL
00210         ADDA    $BA
00220         TFR     D,X
00230         LDB     \0
00240         LSRB
00250         LSRB
00260         LSRB
00270         ABX
00280         LDA     \0
00290         ANDA    #7
00300 *       LDU     #$92DD  PART OF THE PROGRAM
00310         LDA     A,U
00320         COMA
00330         ANDA    ,X
00340         STA     ,X
00350         ENDM
00360
00370         ORG     $6000
00380 SIZE    RMB     1
00390 SS      RMB     1
00400 SIZESQ  RMB     1
00410 SIZECU  RMB     1
00420 WHICH   RMB     1
00430 ACROSS  RMB     1
00440 DOWN    RMB     1
00450 X3      RMB     1
```

repeated enlargements of a 3-by-3 square. Initially all the values within a corresponding 3-by-3 array are set to 1, which means they will each be drawn. Any cell you define as having a value of 0 is skipped by the program and not drawn.

Line 80 starts the main portion of the program. Each cell in the array is checked. If it has a value of 1, the program goes to Line 130 where again each cell is checked. Any value of 1 causes a jump to Line 170, then to Line 210 and finally to Line 250 where the actual computation of the point to be PSET is made. The basic pattern is repeated four times, getting larger each time. Try the program using Line 50 and then using Line 60. A 3-by-3 square is the only size that can be enlarged four times across the screen, and even it gets cut off at the bottom. The next program enlarges squares only three times.

The machine-language program in Listing 3 starts off with a LOCATE macro that computes the current location within the array at any time. LOCATE is followed by a PMODE 4 PSET macro. Notice that Line 300 has been omitted since I can make Register U a constant in the program (I'm not usually this lucky). Space is then reserved for all of the variables. At this point you could set the

PRICES SLASHED ON ALL
ADOS PRODUCTS
LIMITED TIME ONLY!

EXTENDED ADOS-3 ..... $29.95
(Requires ADOS-3)
Disto real-time clock driver, $5.
Adapter for controllers lacking 28-pin ROM socket, $10.

ADOS-3 ..... $24.95

EXT. ADOS-3 PLUS ADOS-3 ..... $49.95

SMARTWATCH REAL-TIME CLOCK $29.95
Usable in controllers with 28-pin ROM socket, or in ROM pack, $10. Includes OS-9 Level II driver. Ext. ADOS-3 driver, $5 with clock, $10 separately.

ADOS FOR CoCo 1 and 2 ..... $14.95

— All ADOS software is sold on disk with configuring utilities that generate an EPROMable binary file. Information is provided for having an EPROM burned by mail for $15.
— See our earlier ads, and reviews in July 1987 and October 1989 Rainbows (available on request) for product descriptions.

SPECTROSYSTEMS
11111 N. Kendall Dr.
Suite A108
Miami, FL 33176
(305) 274-3899

PLEASE ADD $2 S:HIPPING • NO DELAY ON PERSONAL CHECKS
WE CANNOT ACCEPT CREDIT CARDS

GRANITE COMPUTER SYSTEMS
MODEMS

NEW 9600 Baud V.32/V.42/V.42bis data modems. MNP1-5LAPM.
Error Correction and data compression (much higher effective throughput — as much as 38400 Baud). External — call for price

NEW PRICE 2400 Baud V.42/V.42bis data modems. MNP1-5/LAPM.
Error correction and data compression (much higher effective throughput — as much as 9600 Baud). External $189 (+$7 S&H).

NEW PRODUCT 9600 Baud Send/Receive Fax modems.
Send/Receive text/graphics files from/to your computer/any Fax machine in the world. Full 2400 Baud data modem capabilitiy.
Includes software. External $149/Internal $139 (+$5 S&H)

NEW PRICE 9600 Baud SendFax modems.
Send text/graphics files from your computer to any Fax machine in the world. Full 2400 Baud data modem capability. Includes software. External $129/Internal $119 (+$5 S&H)

NEW PRICE 2400 Baud Data modems External $109/Internal $99 (+$5 S&H)

These are all high quality modems made by Zoom Telephonics in the USA. Fully Hayes compatible. Two year mfg warranty. Software available.

S&H Canada (Air PP and Ins) V.42/v.42bis $12.00 Sendfax/Data $8.00

GCS FILE TRANSFER UTILITIES — Version 3.0

The GCS File Transfer Utilities provide a simple and quick method to transfer text/binary files from/to a variety of floppy disk formats.

Commands PC, RS, FLEX disks: Dir, Dump, Read, Write
PC disks: Rename, Delete, Format

Handles most 5.25 and 3.5 formats. Any level sub-directories (PC). Binary files. Use pipes for multiple file transfers. Multi-Vue version can be used under Multi-Vue or as stand alone Shell commands.

Requires OS-9 L2 for COCO 3, L1 for COCO 1 or 2. 2 drives (one can be hard/ramdisk, one floppy 40 T DD DS). Multi-Vue for Multi-Vue version. SDISK3 for COCO3 - SDISK for COCO 1 or 2. Multi-Vue version $54.95 Standard version $44.95
V3.0 updates (provide disk number) $15.00

D.P. Johnson Software SDISK or SDISK3 $29.95 L1+L2 Utils $75.00
Shipping and handlling — any software $2.00

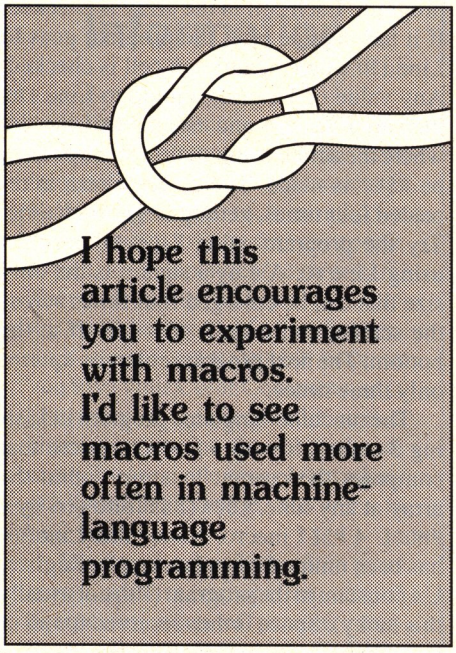
Orders must be prepaid or COD. VISA/MC accepted. COD is additional.

571 Center Road, Hillsboro, NH 03244 USA
(603) 464-3850

OS-9 is a trademark of Microware Systems Corporation and Motorola, Inc.
MS-DOS is a trademark of Microsoft Corp. FLEX is a ttrademark of TSC, Inc.

DP Register to #$60, but the program is quick enough as it is.

Routine THREE is the first loop. Once the location has been computed from the three values passed in the LOCATE macro call, the value of that location is checked. If it's not 0, the program branches to TWO and another


I hope this article encourages you to experiment with macros. I'd like to see macros used more often in machine-language programming.

loop is started. If the new location calculated in Loop TWO is not 0, the program branches to Loop ONE and then finally to Loop ZERO. If the value in this location is 1, lines 1210-1570 compute the coordinates to be PSET. Both coordinates must be checked to see that they are within the 255-by-191 screen. The various size values were poked into their locations by the BASIC program (Listing 2).

You can draw the pattern in three different ways: You can draw from each corner going in; from the center of the screen going out in each direction; or starting at the upper-left corner. The way you want to draw is picked in the BASIC program and the corresponding value stored in WHICH. Routine T1 computes the coordinates for the four corners. Notice that the PSET macro, however, is called using ACROSS and DOWN. Because Routine T2 starts at the center of the screen, it must check to see that coordinates will fit into one-fourth of the screen (127 by 96 pixels). Again, the new coordinates are computed, but still passed as ACROSS, DOWN. Finally, Routine T1 PSETs the new coordinates.

The end of Routine ZERO branches back to Routine ONE where the next value is checked, which may cause a branch back to ZERO. When Routine ONE is completed, it branches back to Routine TWO where the next cell is checked. This may cause a branch to ONE, which may cause a branch to ZERO. The RTS in Line 760 finally ends the

```
00460 Y3       RMB     1
00470 X2       RMB     1
00480 Y2       RMB     1
00490 X1       RMB     1
00500 Y1       RMB     1
00510 X0       RMB     1
00520 Y0       RMB     1
00530 XX       RMB     1
00540 YY       RMB     1
00550 XCORD    RMB     2
00560 YCORD    RMB     2
00570
00580 START    LDY     #ARRAY
00590          LDU     #$92DD  (SEE LINE 300)
00600 THREE    CLRA
00610 L1       STA     Y3
00620          CLRB
00630 L2       STB     X3
00640          LOCATE  X3,Y3,SIZE
00650          TST     B,Y     CHECK THE CURRENT VALUE
00660          BEQ     L3
00670          BSR     TWO     BRANCH IF '1'
00680 L3       LDB     X3
00690          INCB
00700          CMPB    SS
00710          BLS     L2
00720          LDA     Y3
00730          INCA
00740          CMPA    SS
00750          BLS     L1
00760          RTS
00770
00780 TWO      CLRA
00790 L4       STA     Y2
00800          CLRB
00810 L5       STB     X2
00820          LOCATE  X2,Y2,SIZE
00830          TST     B,Y
00840          BEQ     L6
00850          BSR     ONE
00860 L6       LDB     X2
00870          INCB
00880          CMPB    SS
00890          BLS     L5
00900          LDA     Y2
00910          INCA
00920          CMPA    SS
00930          BLS     L4
00940          RTS
00950
00960 ONE      CLRA
00970 L7       STA     Y1
00980          CLRB
00990 L8       STB     X1
01000          LOCATE  X1,Y1,SIZE
01010          TST     B,Y
01020          BEQ     L9
01030          BSR     ZERO
01040 L9       LDB     X1
01050          INCB
01060          CMPB    SS
01070          BLS     L8
01080          LDA     Y1
01090          INCA
01100          CMPA    SS
01110          BLS     L7
01120          RTS
01130
01140 ZERO     CLRA
01150 L10      STA     Y0
01160          CLRB
01170 L11      STB     X0
01180          LOCATE  X0,Y0,SIZE
01190          TST     B,Y
01200          LBEQ    DONE
01210          LDA     SIZECU
01220          LDB     X3
01230          MUL             SIZE*SIZE*SIZE*X3
01240          STD     XCORD
01250          LDA     SIZESQ
01260          LDB     X2
01270          MUL
01280          ADDD    XCORD    +SIZE*SIZE*X2
01290          STD     XCORD
01300          LDA     SIZE
01310          LDB     X1
01320          MUL
01330          ADDD    XCORD    +SIZE*X1
01340          ADDB    X0       +X0
01350          ADCA    #0
```

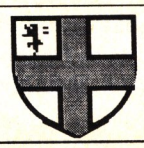
```
01360          CMPD    #255
01370          LBHI    DONE
01380          STB     XX
01390
01400          LDA     SIZECU
01410          LDB     Y3
01420          MUL
01430          STD     YCORD
01440          LDA     SIZESQ
01450          LDB     Y2
01460          MUL
01470          ADDD    YCORD
01480          STD     YCORD
01490          LDA     SIZE
01500          LDB     Y1
01510          MUL
01520          ADDD    YCORD
01530          ADDB    Y0
01540          ADCA    #0
01550          CMPD    #191
01560          LBHI    DONE
01570          STB     YY
01580
01590          LDB     WHICH
01600          CMPB    #3
01610          LBEQ    T3
01620          CMPB    #2
01630          LBEQ    T2
01640
01650 T1       LDD     XX
01660          STD     ACROSS
01670          PSET    ACROSS,DOWN
01680          LDA     #255    UPPER-RIGHT CORNER
01690          SUBA    XX
01700          LDB     YY
01710          STD     ACROSS
01720          PSET    ACROSS,DOWN
01730          LDA     XX
01740          LDB     #191    LOWER-LEFT CORNER
01750          SUBB    YY
01760          STD     ACROSS
01770          PSET    ACROSS,DOWN
01780          LDD     #$FFBF  LOWER-RIGHT CORNER
01790          SUBA    XX
01800          SUBB    YY
01810          STD     ACROSS
01820          PSET    ACROSS,DOWN
01830          LBRA    DONE
01840
01850 T2       LDD     XX
01860          CMPA    #127
01870          LBHI    DONE
01880          CMPB    #95
01890          LBHI    DONE
01900          LDD     #$8060
01910          ADDA    XX
01920          ADDB    YY
01930          STD     ACROSS
01940          PSET    ACROSS,DOWN
01950          LDD     #$8060
01960          ADDA    XX
01970          SUBB    YY
01980          STD     ACROSS
01990          PSET    ACROSS,DOWN
02000          LDD     #$8060
02010          SUBA    XX
02020          ADDB    YY
02030          STD     ACROSS
02040          PSET    ACROSS,DOWN
02050          LDD     #$8060
02060          SUBA    XX
02070          SUBB    YY
02080          STD     ACROSS
02090          PSET    ACROSS,DOWN
02100          BRA     DONE
02110
02120 T3       PSET    XX,YY
02130 DONE     LDB     X0
02140          INCB
02150          CMPB    SS
02160          LBLS    L11
02170          LDA     Y0
02180          INCA
02190          CMPA    SS
02200          LBLS    L10
02210          RTS
02220
02230 ARRAY    RMB     1
02240          END     START
```

program and returns to BASIC. Save the source code with `W ENLARGE.ASM` and assemble with `A ENLARGE.BIN /NS/WE`.

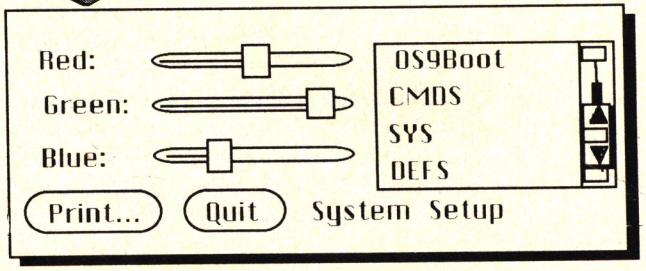
The BASIC driver in Listing 2 clears space for the machine-language program and loads it, if necessary. After you choose the size of square you want, Line 60 pokes the size values into their locations. You must then decide whether you want the computer to pick a random pattern or if you want to draw it yourself. In either case, a large square is drawn on the screen. If you chose the random pattern option, some of the inside squares will be black — these are the squares that won't be drawn. If you don't like the pattern, press the up arrow and a new one will be drawn. If you are creating your own pattern, move the joystick until it flashes the square you want and press the firebutton to reverse the color in that square.

In either case, when you have a pattern you like press, ENTER and then decide in which direction the pattern will be drawn. When the pattern is completed, press ENTER and then either reformat the old square or start with a new one. The larger the square, the longer it will take to complete the enlargement. Remember, the program may still be working even if it appears otherwise. The ENTER key works only when the pattern is finished. Save this program as ENLARGE2. For a sample, number the cells of a four-sided square from 1 (upper left) to 16 (lower right), blacken squares 3, 8, 9 and 14 and then choose Direction 1. When the pattern is finished, also blacken square 16 and try again.

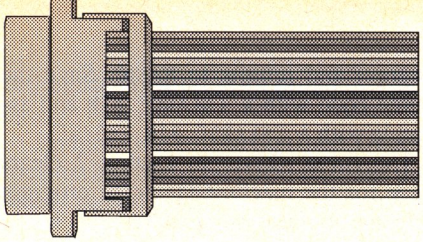
You could convert this program to color, but in the CoCo 2 you'll only have 128 bits across to use, so large squares won't give you a pretty design. The `PMODE 4` program shows artifact colors on my television. I hope this article encourages you to experiment with macros. I'd like to see macros used more often in machine-language programming. If you have questions about macros or any suggestions for subjects you'd like to see covered, please let me know.



Burke & Burke
P.O. Box 733
Maple Valley, WA 98038



OSKenLook: The Next Interface...



Literally Speaking

by Eddie Kuns
OS-9 SIG Database Manager

You may have noticed that many forum messages are nicely formatted, with centered lines and indented sections. Well, if you've wondered how people create these formatted messages, pay attention. I'm going to disclose all their secrets — they use dot commands.

Normally when Delphi displays the text you entered as your forum message, everything you type is automatically reformatted for the width of the screen on which the message is being read. Therefore, you can type your text 80 characters wide without the text looking odd on a screen with only a 32-column capability. Delphi automatically reformats the text to the proper width. These reformatting rules are simple: If several consecutive lines of text all begin with a nonblank character, they are considered one block of text. A block of text is ended by a blank line, and a line beginning with one or more blanks begins a new block. For example, the following text,

```
Hey, everybody! This is
a test of forum's
   automatic line formatting!
What will this look like
when formatted?
```

is reformatted as shown in Figure 1.

This automatic reformatting can sometimes interfere with the way you want your message to appear. For this reason, there are two often-used commands that almost always appear in pairs: `.lt` and `.el`. The `.lt` command instructs Delphi to start the *literal mode*, and `.el` ends the literal mode. Note that these commands must be by themselves on a line, and the period must be the first character on the line (hence the name, dot commands). In literal mode the text appears exactly as entered, without any reformatting.

One way to get nicely formatted forum messages is to edit the message offline. Put `.lt` by itself on the first line and `.el` on the last. Then send this file as your forum message.

The problem with literal mode is that the message appears nicely formatted only to those whose terminals are as wide as the terminal you used to enter the text. For this reason I discourage use of this mode except for specific sections of a message. Literal mode is invaluable for presenting tables, or for including code fragments or other types of text you don't want reformatted. Figure 2a shows a sample reply to a user's question. To get this result, the author placed a `.lt` by itself on the line just prior to the `float` declaration. He also put `.el` on its own line after the call to `pffinit`. Figure 2b shows how it would look if he hadn't.

```
Hey, everybody! This is a test of forum's
   automatic line formatting! What will this look like when formatted?
```

(a) 80-column Screen

```
Hey, everybody! This is a test
of forum's
   automatic line formatting!
What will this look like when
formatted?
```

(b) 32-column Screen

Figure 1: Automatic Text Reformatting

Turning the Page

The `.page` command is a very useful dot command that allows you to ask those reading your message if they want to continue reading. If you are posting a long source-code listing in response to a specific person's question, it is possible that not everyone will be interested in reading several pages of code. A polite way of handling this is to announce that the message is long and include a line similar to the following:

```
.page Continue reading?
```

This causes Delphi to ask anyone reading your forum message if they want to continue. If they answer "No" (or press N), they will proceed to the Forum> prompt

---

Eddie Kuns is pursuing a PhD in physics at Rutgers University. He lives in Aurora, Illinois, and works as a programmer and researcher at Fermilab. Eddie is co-manager of the CoCo SIG; his username is EDDIEKUNS.

```
You need to include pffinit to print floating point variables. This should do
the trick in this case:

float f;
double d;
pffinit();

Hope this helps!
```

(a) Desired Result

```
You need to include pffinit to print floating point variables. This should do
the trick in this case:

float f; double d; pffinit();

Hope this helps!
```

(b) Without Dot Commands

Figure 2: Use of Literal Mode

without seeing the remainder of the message. But if they answer "Yes" (press Y) or just press ENTER, they will see the rest of your message. The `.page` command without any additional text simply generates a More? prompt.

A Marginal Situation

With dot commands, you can also play with the margin settings, although the only margin normally changed is the left margin. If you want to indent a section of text, precede that section with `.lm 5` and follow it with `.lm 0`. This sets the left margin to the fifth column for the section you want indented and resets it to normal following the indented text.

If you include a section of text from another message and want to "quote" that text to separate it from your own, you can use a special feature of the `.lm` command that is more easily demonstrated than explained. In the following snippet, I quote another user's question:

```
.lm 4 /annot=>
Hey, Eddie. How was your trip?
.lm 0

It was great!
```

Here's how it appears:

```
>   Hey, Eddie! How was
>   your trip?

It was great!
```

Yes, the > symbol in the left margin comes from the `/annot=>` part of the `.lm` command. You can use any character or characters you want. Sometimes a short quote from the message to which you are replying is very helpful in supplying a context for your reply. I emphasize *short* — you don't want to quote the entire message, just enough to make it obvious to what you are replying.

There are several other, less-used, dot commands. I'll save these for next month and provide an example showing several of these dot commands in use.

Database Information

The OS-9 databases have been undergoing some reconstruction as you may have already noticed. Greg Law, the OS-9 SIGop, has been working very hard, with some help from me and other users, to reorganize the OS-9 databases. There are two goals: To make files easier to find; and to make the databases more consistent. The result of this is that many files may be moved from one database into another. Some databases are being merged, such as Applications and Utilities, while others may be split. I will have more details on this next month, but for now, don't worry. No files will be deleted.

In the OS-9 General Information database, **Jim Sutemeier** contributed an article describing how to build a UPS (Uninterruptible Power Supply) for the CoCo. If you have trouble with momentary brownouts, you may want to take a look. **Greg Law** posted a patch for Computerware's `dircopy` to allow this utility to work with OS-9 Level II windows. **Brian Paquette** submitted a Pig Latin filter that functions a lot like the Valley Girl filter I mentioned last month. **Philip Brown's** single-sided `copy` program allows you to copy files from one disk to another when you have only one disk drive. While Tandy's `copy` command has a single-drive option, it requires that both disks be formatted identically.

In the Device Drivers database, **Hugo Bueno** posted a patch to `windint` that disables its erasing and redrawing of each

ACE

American Computing Equipment
P.O. Box 39281
Louisville, KY 40233

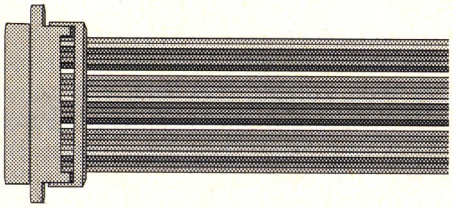
1-800-346-2794
9am-6pm. VISA/MC/Check
Shipping: US $3, Canada $5,
Other Countries $7
C.O.D. add $3
KY residents add 6% sales tax

NEW! Graphics Oriented Assembly Language

A brand new language from a brand new Color Computer supporter. GOAL (Graphics Oriented Assembly Language) is modeled after 68000 and VAX-11 assembly language to make programming in assembly easier.

* **Programs are assembled into memory-saving object code**
* **Low-level principles mean GOAL programs execute fast**
* **V1.00 has over 200 instructions with 40 special graphics instructions**
* **Multi-tasking feature allows a BASIC program and many GOAL programs to run simultaneously**
* **19 powerful memory-saving addressing modes**
* **130 pages of documentation, sample programs, assembler, interpreter, and fonts included**
* **CoCo 3 version requires at least 128K, disk drive**
* **CoCo 2 version requires 64K, disk drive**
* ***Price until August 31st: $29.00***
* **GOAL Icons & ACE Fonts: Each $10.00**
* **GOAL, Icons, & Fonts: All three for $39.00**
* **OS-9 Version Available In August**

window's title bar when you change to, or from, a *Multi-Vue* menu window. Because interrupts are disabled while the title bar is being redrawn, some people lose characters when they switch windows while telecommunicating. This patch fixes the problem. **Tim Kientzle** uploaded a patched version of the Burke & Burke real-time-clock driver that includes the patches described by Bruce Isted in the August 1990 issue of THE RAINBOW as well as other enhancements.



Tim Kientzle released the newly-ported *Small C* compiler, which he worked on with Philip Brown, into the Programmer's Den. If you don't have the Microware C compiler, or if you always wanted to examine the inner workings of a compiler, take a look. *Small C* doesn't support all the features of C. Brian Paquette's *Mini Lint* looks for balanced parentheses, curly braces and comment markers in C source code.

Ed Gresick posted an index to the TOP disks. (TOP stands for The OS-9 Project and is located in Germany.) The TOP disks contain a lot of free software, either ported from other operating systems or written from scratch. Most of the TOP programs work only on 68000-series machines because of their size.

In the CoCo SIG, **Marty Goodman** described his efforts to repair a "Golden Hour" clock and the NiCad battery pack for his Toshiba portable computer. **Larry Moore** released a newer version of **Steve Ricketts'** *DS69View* with the printer driver for the Tandy CGP-220 printer. Larry Moore also posted two 1991 printer art calendars. While this article won't see print until the middle of the year, it's not too late to take a look. **Richard Trasborg** uploaded a new version of **David Mills'** 640 IMG viewer. This release fixes a problem some people encountered when trying to use 3½-inch drives with an earlier version.

Art Flexser contributed a text-file splitter. This program takes a large text file and splits it into several pieces — prompts ask how large you want each segment to be. This is useful if you download a huge file and your editor can only look at part of it at a time. **Rick House** uploaded four games; two betting games — a slot-machine and roulette — and two others. **Joe Sannucci** released the latest version of **Wayne Laird's** BBS list, which includes over 325 BBSs spanning four continents! ❑

Database Report

OS-9 SIG

General Information

COCO3_UPS
JSUTEMEIER Jim Sutemeier
DELMAR SOFTWARE
PAGAN Stephen Carville
MM/1 IN RICHMOND
PKW Paul K. Ward
GNU NEWSLETTER
JBUCATA Jason Bucata
DELMAR AND PERIPHERAL TECHNOLOGY
EDELMAR Ed Gresick
MM/1 SOFTWARE BUNDLE
PKW Paul K. Ward
MM/1 AT BUSCON
PKW Paul K. Ward

Applications

DIRCOPY PATCH FOR LEVEL 2
GREGL Greg Law
MVCHECK V2.2A PATCH
KEITHBAUER Keith Bauer

Utilities

DOALL: MULTIPLE FILE MANAGEMENT
THEFERRET Philip Brown
SPEECH FILTERS
MDALENE Mike Dalene
INDENT V2.0
THEFERRET Philip Brown
NEW HEADER
RICKGRAY Rick Gray
SBACK V1.0
SEBJMB Jeff Blower
APPLICATIONS
BSCHWING Baron Schwing
SCREEN DUMP VERSION 1.1
MARLOU Marie-Louis Marcoux
SGREP
BRIANPAQ Brian Paquette
PIG LATIN CONVERTER
BRIANPAQ Brian Paquette
SINGLE-SIDED COPY
THEFERRET Philip Brown
LOTTO.AR
JSUTEMEIER Jim Sutemeier
SCRIBE- TEXT GENERATOR
BRIANPAQ Brian Paquette
SPEECH SUPPORT
MDALENE Mike Dalene

Device Drivers

WINDINT INTERRUPT PATCH
MRGOOD Hugo Bueno
CLOCK.BB FOR B&B RTC
TIMKIENTZLE Tim Kientzle

Graphics & Music

MILITARY SOUNDS
DRIFTY Richard Gonzales
HIS LAST DAYS (UME, MT-540)
DFYE Danny Fye
HIS LAST DAYS (UME, MT-240)
DFYE Danny Fye
MICHELLE IN LACE ON THE BEACH
BOYNGER David Boynton
KRISTIAN AND CHRISTIE IN SWIMSUI
GRAPHICSPUB Bob Montowski

Programmers Den

ALARM.H
THEFERRET Philip Brown
MF1TOO.ART
PAULSENIURA Paul Seniura
EASE THE USE OF PASCAL09
TONYSCHOUNTZ Tony Schountz
MOTOROLA CROSS ASSEMBLERS
NES Eric Stringer
RANDOMIZE.AR
JSUTEMEIER Jim Sutemeier
IOCTL.H + SGTTY.H
THEFERRET Philip Brown
MINILINT
BRIANPAQ Brian Paquette
SMALL C COMPILER
TIMKIENTZLE Tim Kientzle
ANSIDRV THE C VERSION
MDALENE Mike Dalene

68K-OS9

TOP DISKS INDEX
EDELMAR Ed Gresick

Tutorials & Education

NEW ELEMENT
OS9BERT Bert Schneider

CoCo SIG

General Information

REPAIRING A GOLDEN HOUR
MARTYGOODMAN Marty Goodman
TOSHIBA 1000 NICAD FIX
MARTYGOODMAN Marty Goodman

CoCo 3 Graphics

MARVEL SUPER HEROES
RICKMAC Richard McNabb
DS69VIEW W/PRINT FOR CGP220
LDMOORE Larry Moore
BLADERUNNER SCANS
RICKMAC Richard McNabb
MODELT.CM3
RICKMAC Richard McNabb
NEW 640 IMG VIEW MASTER
TRAS Richard P. Trasborg
DICK TRACY CM3 PICTURE
CORTLEY Patrick Fingliss
1991 PRINTER ART CALENDARS
LDMOORE Larry Moore
MORE COCOMAX ART BY HCR
HOWARDC Howard C. Rouse
3 MORE COUNTRY GIRLS IN IMG
LDMOORE Larry Moore

Utilities & Applications

TEXT FILE SPLITTER
ARTFLEXSER Art Flexser

Games

SLOT.BAS
HOUSES Rick House
ROULETTE
HOUSES Rick House
DUNGEON DEPTHS FIX FOR ADOS-3
ARTFLEXSER Art Flexser
SCUD MISSILE ATTACK
HOUSES Rick House
JOUST-A KNIGHTS BATTLE
HOUSES Rick House

Product Reviews & Announcement

DEMO FOR CHECKBOOK+
JOELHEGBERG Joel Hegberg

Telecommunications

COCOS9ER.TX5
SANNUCCI Joe Sannucci

Received and Certified

The following products have recently been received by THE RAINBOW, examined by our magazine staff and issued the Rainbow Seal of Certification, your assurance that we have seen the product and have ascertained that it is what it purports to be.

System IV, a 68000-based computer that runs OS-9/68000, Uniflex, MINIX, StarDos and REXDOS. The Terminal system includes one megabyte of memory, four serial ports, two parallel ports, one high-density floppy drive and a PC-compatible keyboard interface. The Console system includes the above features and adds a VGA card and a 101-key, AT-style keyboard. Both systems include Professional OS-9/68000, Version 2.4. *Delmar Company, Middletown Shopping Center, P.O. Box 78, Middletown, DE 19709, (302) 378-2555; Terminal system $999; Console system $1149.*

All Rick's Software, an offering of every program advertised by Rick's Computer Enterprise: *CC3FLAGS*, a Risk-type strategy game; *VOCAB*, a scrabble word game; *Master Dir*, a disk database; *Programs for Friends*, three educational programs and a card game; *The Rainbow Indexes*, a database of all articles published in THE RAINBOW; *NIB Compressor*, a graphics compression utility; *Rick's CoCo Gallery*, selected pictures from Rick's personal library; *Gallery Maker*, a graphics viewing utility for your own picture files; *Puzzles*, a jigsaw puzzle program that lets you create puzzles from your own graphics pictures; *Tetra*, the popular block-puzzle game; *Master Directory 3*, all new CoCo 3 version of *Master Dir*; and *Steve's Pics*, more graphics pictures. *Rick's Computer Enterprise, P.O. Box 276, Liberty, KY 42539; $33, plus $2 S/H.*

DynaStar — OS-9/6809 and OS-9/68000 versions, a menu-driven screen editor equally suited to the tasks of program preparation and word processing. Single-keystroke commands move the cursor in any direction by character, word, tab, line or full screen. These commands also delete characters, words, or even whole lines. For programmers, there is an auto-indent mode. *DynaStar* permits editing files larger than memory. *Dynastar* has a Help menu that displays at the top of the screen a brief definition for each command. *DynaStar* allows users to create powerful macros with its unique macro facility. Also included is the *DynaForm* print formatter. *DynaForm*'s standard features include pagination, headers and footers, single, double, and multiple spacing, boldface, double-strike, underline, and a macro facility with many options. *Frank Hogg Laboratory, 204 Windemere Road, Syracuse, NY 13205, (315) 469-7364; $200, plus $5 S/H.*

◆ **Goal 1.00**, Graphics-Oriented Assembly Language (GOAL) for the CoCo 3. If you already know assembly language, this reference is all you need for programming in GOAL. It comes with a 134-page manual and software. Software includes an assembler, an interpreter, sample GOAL boot programs, fonts and sample programs. Requires a 35- or 40-track disk drive. *American Computing Equipment, P.O. Box 39281, Louisville, KY 40233, (502) 459-7966; $29*

Disk Manager's Apprentice, a new file-management utility set for use with the CoCo 3 under Disk BASIC. Each utility in the set has been created to help you organize Disk BASIC disks and the files on the disks. These utilities are combined into a single executable environment called DMA. Once booted, all utilities are memory resident. Some of the tools are: Full wild-card file handling — all wild-card syntax can be used with `COPY`, `KILL`, `MOVE`, `VIEW`, `DIR`, `CAT`, etc.; and Point and Select filename features — allows tagging of multiple files to copy, kill, etc. DMA supports RAM disks. Requires a CoCo 3, at least one disk drive and an 80-column display. *CoCo PRO! Products, 1334 Byron Ave., Ypsilanti, MI 48198, (313) 481-3283; $29.95, plus $4 S/H.*

Tools II, a new set of 27 OS-9 Level II tools to make your computing easier. Features window utilities (such as a screen saver, global search-and-replace with wild cards, a `GO` command to easily change directories), process-scheduling utilities, `alarm` and `demon` (a sophisticated background-task manager with scheduling), script-file utilities, `recobbler`, I/O port utilities including `netlink` and an autodialer for voice calls, and calculation utilities. *CoCo PRO! Products, 1334 Byron Ave., Ypsilanti, MI 48198, (313) 481-3283; $34.95, plus $4 S/H.*

DPMAX, two additional programs for the Delta Pro package — `DPMAX` and `DACCOMM.BIN` — to increase the productivity of your Delta Pro system. `DPMAX` is an interface program using `DCOMM.BIN` as the main digitizer and disk access routines. `DPMAX` offers advanced features such as jump sequencers, MIDI playback, real-time level meter and memory displays, point-and-shoot interface during record and playback, and constant audio monitoring. `DACCOMM.BIN` is a machine-language interface program that uses the CoCo 3 interrupts to allow playback of Delta-Encoded sound files through the CoCo 6-bit DAC. This allows for playback without the Delta Pro pack. *DPMAX* requires a CoCo 3, a disk drive, the Delta Pro interface pack, a Multi-Pak or Y cable, and a joystick or mouse. *Lucas Industries 2000, 14720 Cedar Street NE, Alliance, OH 44601, (216) 823-4221; included with the purchase of the Delta Pro package.*

OS-9 Calendar Utilities, utilities designed to work alone or as companions to `gcal`, the calendar program supplied with *Multi-Vue*. They allow the user to automate many of the repetitive tasks that go with maintaining `gcal` calendar files. The utilities operate on data files of the same format as those created by `gcal`. Also included on the disk are a *Multi-Vue* application-information file (AIF) and an icon file for use with `gcal` under *Multi-Vue*. The user can click on a calendar data file and have it opened automatically when `gcal` runs. *MV Systems, P.O. Box 818, Arvada, CO 80001-0818, (303) 420-7777; $14.95, $2.50 S/H.*

◆ **First product received from this company**

The *Seal of Certification* is open to all manufacturers of products for the Tandy Color Computer, regardless of whether they advertise in THE RAINBOW.

By awarding a *Seal*, the magazine certifies the program does *exist* — that we have examined it and have a sample copy — but this *does not* constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forwarded to THE RAINBOW reviewers for evaluation.

Database CoCo 1, 2 & 3

Baseball Card Catalog

A couple of weeks ago a friend noticed I had a small stack of baseball and football cards from my childhood days of card flipping. A few days later she brought over a magazine so we could check their present values. To our amazement, we found that the handful of cards is worth hundreds of dollars — one particular Nolan Ryan card topped them all at $150! I knew the cards would be valuable someday, but this was a shock after having paid little, if any, attention to their rising value over the last 20 years.

Recently I saw an advertisement for the grand opening of a sports-card shop. I also learned that card swap meets are held regularly in my area. Suddenly I saw the money-making potential of this old hobby, but I needed to organize my records. Then *Baseball Card Catalog*, a product from the Millsoft Company, arrived for review.

Baseball Card Catalog is a database that is designed to help serious card collectors keep track of their baseball cards. The program requires a CoCo 3, two disk drives and a monitor (a printer is optional). There are also other versions of the program available for tape- or disk-based CoCo 1 and 2 systems.

The package contains a straightforward, easy-to-use five-page manual and one floppy disk. I ran the program after making a backup copy of the disk and formatting a few disks to hold data files.

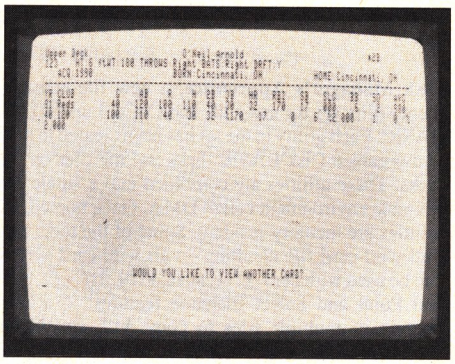
First, the title screen appeared. Then, I waited approximately a minute while a baseball diamond was drawn on the screen accompanied by a few bars of music. I could have done without this time-consuming process. (Use the program 60 times and an hour has been wasted watching a title screen!)

Finally, the Main menu is displayed. There are several options from which to choose, including data entry, deleting, viewing, printing or ending the session.

There are four categories for data entry: Pitcher, Fielder, Record Breaker and Managing Staff. (Using a separate disk for each category saves time when retrieving information.) The program allows you to enter a comprehensive record of each player's traits and cumulative statistics. In short, you can enter all of the information from the back of a card. The data is stored in a one-granule disk file.

The Print option allows you to print only a single card. I would like to see an option for printing all data files. If I go to a swap meet, it could be advantageous to have a printout of all cards.

Baseball Card Catalog fills a niche in my library. But if you have a large collection, the data entry procedure will require many hours of typing. In addition to having your card information stored on disk, it is also advantageous to have your cards in binders in an order that facilitates easy access. (It is surely less time-consuming.)



I might sell some of my cards in the near future, though I stress the word *might*. After all, few cards in the collection show signs of future value decreases. And with cards like this year's Upper-Deck, autographed Nolan Ryan card already a collectible, my interest in this hobby has been renewed. My collection may now outgrow this program.

Baseball Card Catalog works as advertised, but it would have more versatility if the heart of the program, the database, used a better data storage/retrieval technique.

(The Millsoft Company, Box 2377, Amagansett, NY 11930; 516-324-7953; $18.95)

— Jamie Hensen

Graphics CoCo 3

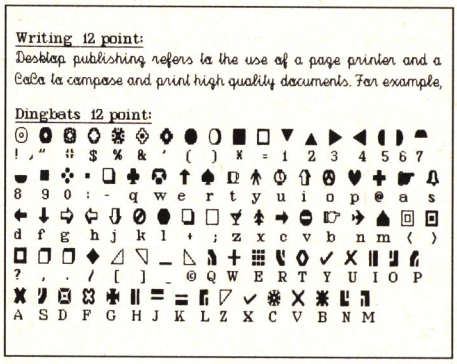
D10 Fonts

Two products from Coless Computer Design — *M10 Clip Art* and *D10 Fonts* — are among the best CoCo products I've seen in the past five years. (See the review of *M10 Clip Art* in this issue of THE RAINBOW.)

D10 Fonts is an add-on to the *Max-10* desktop publishing program. Sooner or later *Max-10* users break down and buy additional font sets to experience the full flexibility of this excellent product. However, even with the full add-on sets from Colorware, there has always been room for further expansion — and a strong need for some very specific additional items.

Walter Bayer of Coless Computer Design was involved in some of the work that led to *Max-10*, and he enthusiastically supports it. He produced *D10 Fonts* to fill some of its gaps. There are "only" 19 fonts in this package, but they provide an excellent sample that may be used immediately with the standard *Max-10* program or used to supplement the Colorware font offerings.

By the term supplement, I have in mind such useful items as Woodhaven 8 Point, which fills out the size variety of this popular and useful font family. Other fonts where *D10 Fonts* fills out partial families include Venice and Digital. *D10 Fonts'* Writing 12 provides an alternative freehand script to the one in the older group. If your desktop publishing efforts include some simulated freehand correspondence between two people, the slight differences between these two freehand-like fonts might be an artistic need rather than just an affectation.


Writing 12 point:
Desktop publishing refers to the use of a page printer and a
CoCo to compose and print high quality documents. For example,
Dingbats 12 point:

D10 Fonts also includes a Times Roman font family, a Block family, and Display (an alternative block style). Peignot, also provided over a range of sizes, is hard to describe. I think of Peignot as an informal cross between Block and Woodhaven, but you might think otherwise.

My son's class project in junior high last year required him to create a six-page newspaper that simulated our town newspaper as it might have appeared 70 years ago, but all of the stories and editorials had to be written by him and his partner. Without *Max-10* he could not have done it. Before this project I thought having a font library was rather silly. With requirements such as a different typeface for the sports, editorial,

and news pages, for each author, and for headlines, classified ads, etc., this project made me realize why font libraries exist. The Coless Computer Design package is a welcome addition to this library.

The main value of this package is that it finally provides *Max-10* with a good Zapf Dingbats 12 set. For those who do not know what this is, the name Zapf Dingbats (usually provided in 12 point) is reserved for a graphics font of small, miscellaneous symbols often needed inside text. Such symbols include the characters for the four card suits used in bridge columns, a Maltese cross, male and/or female figures, a check mark, a bell, a pointing hand, a martini glass and a small watch. These symbols also include editing and arrow characters. Do not confuse a Zapf Dingbats font with clip art — Zapf Dingbats are much smaller and serve a distinctly different purpose. Zapf Dingbats are used inside the text and take up one character position per symbol.

In summary, this font set is useful, works properly with the other *Max-10* elements, and is quite inexpensive. I highly recommend it, especially after learning that Mr. Bayer provides immediate technical support for any problems you might have. My problem was a defective disk that caused his loading program to crash. We traced the problem to a badly done backup procedure, and his willingness to go through a step-by-step process is one more plus for an already excellent package.

(Coless Computer Design, 1917 Madera St., #8, Waukesha, WI 53186; 414-549-0750; $14.95, plus $3 S/H)

— H. Larry Elman

Graphics CoCo 3

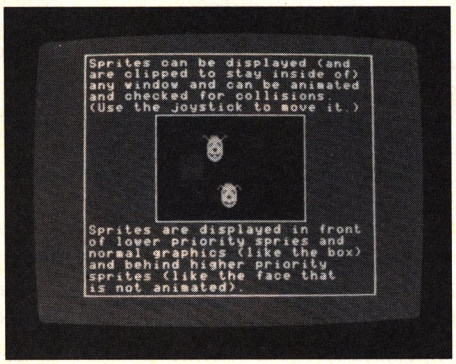
GrafExpress 1.0

Softronics Vanguard has introduced its first offering to the CoCo community, and what an offering it is. *GrafExpress 1.0* is a graphics/sound system that can help you when creating games and many other types of programs.

GrafExpress comes with a well-written, 38-page manual that provides great detail on using the various programming features. Section 1 of the manual deals with general information about the system. Section 2 explains how to use *GrafExpress* with BASIC. Section 3 details how to use *GrafExpress* within assembly-language programs. And the final section reviews the application programs included with the package.

To take advantage of this program's features you must have a CoCo 3, a disk drive and one joystick. *GrafExpress* supports both composite and RGB displays, joysticks with or without a Hi-Res interface and the CoCo 3's high-speed operation.

After making a backup of the *GrafExpress* disk, you can run the introductory program that showcases some of the capabilities of this programming system. These include 12 different graphics screen sizes with horizontal resolution from 128 to 320 pixels and vertical resolution from 192 to 225 lines per screen, fast-drawing commands, multiple-screen animation, screen scrolling, an 8-octave/4-voice music synthesizer, sprite animation, object-collision checking, and high or low priorities for the sprites. The sprite priorities allow you to choose whether an animated sprite appears to be drawn (or moved) in front of or behind another sprite. With the *GrafExpress* system you can also create windows on a screen. You can then move the windows on the screen, copy from one window to another, and turn the windows on or off. You can also set a screen's border color, select fast or slow CPU operation, turn text echoing to the screen on or off, select different text font sizes, turn sprites on or off and define music waveforms.


Sprites can be displayed (and are clipped to stay inside of) any window and can be animated and checked for collisions. (Use the joystick to move it.)
Sprites are displayed in front of lower priority sprites and normal graphics (like the box) and behind higher priority sprites (like the face that is not animated).

Three application programs are included with *GrafExpress*: An Intro program, *Pic-Maker* and *Wave-Maker*. *Pic-Maker* is a graphics editor that allows you to create pictures pixel by pixel with a joystick. From a choice of 16 different colors, you can set a pixel, draw a line, and draw either a box outline or a box filled with one of the colors. There are also provisions for saving, loading and killing picture files. A Directory command is available for checking the filenames on a disk. Pictures created with *Pic-Maker* can then be used later with the *GrafExpress* system as simple pictures or animated (or non-animated) sprites.

Wave-Maker is used to create waveforms for any music you might want to use in your program. With the joystick, you can set the volume, frequency, decay rate, tempo and duration of a note. In addition, you can select the weights for the eight harmonics that make up a waveform for the note. A representation of the waveform is displayed on the screen, and a Max command allows you to optimize a waveform if some of the weight settings cause distortion or "clipping" of the harmonics when a note is played. There is no provision for saving or loading the waveform harmonics or any of the other values you may use in *Wave-Maker*, so you must write them down if you plan to use them later.

In addition to performing their primary functions, the three included application programs provide concrete examples for using *GrafExpress*.

The *GrafExpress* system does not replace BASIC, but augments it. With 49 commands to learn, *GrafExpress* may be a little intimidating to the novice or inexperienced programmer. To the more experienced, however, *GrafExpress* can be a great benefit since the author explains how to implement the *GrafExpress* system in both BASIC and assembly language to achieve multiple-screen animation, multiple waveforms and up to 255 pictures, screens, sprites or windows.

I found it quite enjoyable and rewarding to use the *GrafExpress* system, especially when I could move my graphics creations around the screen with sound and/or four-voice music. With some practice and programming time, it is possible to create impressive games and programs for the CoCo 3.

If you want to market a program created with *GrafExpress*, you must understand that only those of you who own the *GrafExpress* system will be able to use that program. You may discuss with the author the possibility of licensing a program with the *GrafExpress* system included.

(Softronics Vanguard, 605 Evergreen Drive, Holmen, WI 54636; 608-526-9226; $35)

— Richard L. McNabb

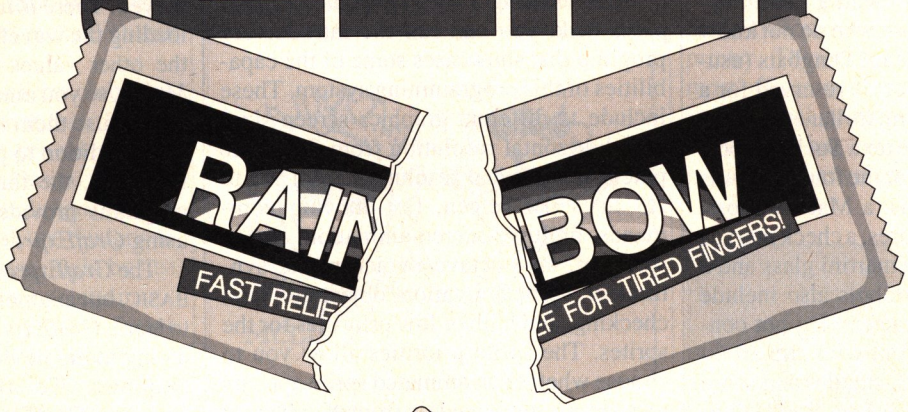
Graphics CoCo 3

M10 Clip Art

After almost 10 years of writing software reviews, I've learned that some products are both fun to experiment with and easy to review because they take little work and give much pleasure. Among the best of these products is a set of clip art from Coless Computer Design.

The *M10 Clip Art* package is intended for use with the *Max-10* home publisher. It contains 300 separate pieces of clip art pack-

RELIEF

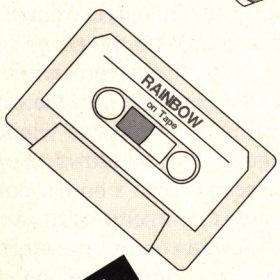


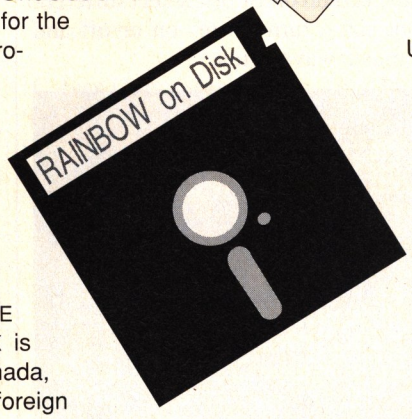
Subscribe to these convenient services and receive each month's programs in a ready-to-run form. No more long tedious hours wasted typing! No more red eyes and sore fingers! All you do is load and run, using the current issue of THE RAINBOW as documentation.

OS-9 programs are available too! One side of the RAINBOW ON DISK is formatted for the OS-9 operating system (OS-9 programs cannot be put on tape) so you can get all the great programs in the magazine.

A one-year subscription to THE RAINBOW and RAINBOW ON TAPE is only $91 in the U.S., $108 in Canada, $153 foreign surface rate and $188 foreign airmail.

A one-year subscription to THE RAINBOW and RAINBOW ON DISK is only $115 in the U.S., $138 in Canada, $183 foreign surface rate and $218 foreign airmail. U.S. currency only.





Back issues of both RAINBOW ON TAPE and RAINBOW ON DISK are also available! (see our back issue ad in this issue)

RAINBOW ON TAPE back issues are available beginning with the April 1982 issue. A single copy of RAINBOW ON TAPE is $10 within the U.S., $12 in all other countries. The annual subscription for RAINBOW ON TAPE is $80 within the U.S.;$90 in Canada; and $105 for all other countries. U.S. currency only.

RAINBOW ON DISK back issues are available beginning with the October 1986 issue. A single copy of RAINBOW ON DISK is $12 within the U.S., $14 in Canada, $16 in all other countries.The annual subscription for RAINBOW ON DISK is $99 within the U.S.;$115 in Canada; and $130 for all other countries.U.S. currency only please.

Subscribe today and start enjoying THE RAINBOW and your CoCo the easy way, without the fuss!

and Save Money Too!

Yes! Sign me up for a joint 1-year subscription (12 issues) to:

❑ THE RAINBOW and Rainbow on Tape ❑ THE RAINBOW and Rainbow on Disk

❑ New ❑ Renewal (attach labels)

Name _____

Address _____

City _____

State _____ Zip _____

❑ My check in the amount of _____ is enclosed.

charge to: ❑ VISA ❑ MasterCard ❑ American Express

Account Number _____

Expiration Date ____ Signature _____

Use our convenient subscription envelope inserted in this magazine. For credit card orders call(800) 847-0309, 9a.m. to 5 p.m. EST. All other inquiries call (502) 228-4492

*** Payment must accompany order, we do not bill. U.S. currency only, please. Kentucky residents add 6% sales tax; Canadian residents , 7% GST. Please allow 6 to 8 weeks for delivery of first copies. All subscriptions begin with the current issue.**

Please note : While group purchases of RIANBOW ON TAPE and RAINBOW ON DISK are permitted (and multiple subscriptions are even discounted, if purchased in one order from a club), no license to make copies is conveyed or implied. Unauthorized coping of any copyright product is strictly illegal.

aged on five flippy disks. For those of you who have two-sided drives, please remember these are flippy disks, not floppy disks. If you forget that you are working with flippy disks, you may wonder why you can't get to half of the files. They are accessible — just flip the disk over. Anyhow, five disks and a good manual at this price is an amazing bargain.

Most clip art users in our local club print the art so they can view it at their leisure rather than using the often-provided View program. Coless Computer Design provides a manual with all 300 clip-art designs printed for your convenience. With 300 designs to choose from, a view program might be just too unwieldy, and I like their solution.

Coless Computer Design has always provided excellent technical support for their products — even by phone — but it was not needed at all for this package. However, while talking to Mr. Bayer (Coless owner) as part of a review for a companion product (*D10 Fonts*), he remarked that he has over 1500 clip art items that can be used with *Max-10* if simply moved from one format to another. He put in a plug for his *CIII PagesE*, which he used to move the 300 images in this package to *Max-10* format from the more-packed format his products use. I immediately bought *CIII PagesE*. Although it is a full graphics program, my interest for this review is only in the clip-art moving/reformatting utility.

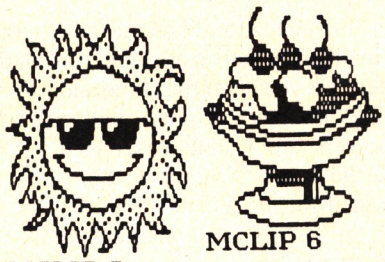
I disagree with Mr. Bayer on one point, however. He said that if a user has the *CIII PagesE* clip-art-format moving utility, nothing else is needed. This statement presumes greater artistic ability than most of us have and also undervalues the excellent artistry in the 300 samples provided.

Putting any of these clip-art items into your *Max-10* text is simplicity itself — about three menu-driven mouse clicks is all it takes. And this is the first clip art I've used that is of sufficient quality that I could take pleasure in using the expand/shrink/resize options.

The 300 clip-art images include symbols for almost every known holiday in North America, both civic and religious. The more well-known holidays (like Christmas) have whole collections of images. Also included are a number of patriotic and military symbols.

There is a full, 26-letter illuminated alphabet for those who want to begin text chapters in a manner reminiscent of monks hundreds of years ago. Don't laugh, I found this, plus shrink/expand, too tempting, and I spent almost an hour playing with the selections in just this one section!

Another disk contains the entire set of zodiac signs and the symbols of the major political parties. (Is this possible proof that politicians are just modern astrologers?) The normal collections of office symbols and academic symbols are also present. Two of my favorites are an angry-looking teacher who seems to come from the "Archie" comic strip and a disgusted parent examining a report card.



MCLIP 2

MCLIP 6

Transportation and sports are covered with about two dozen images. There are a dozen or two animals and all sorts of faces, including a recognizable Marilyn Monroe. As for quality, I printed many of these images on my NX-1000 and was pleased with the results.

Adding the *M10 Clip Art* package to a *Max-10* collection is a must for the serious CoCo user.

(Coless Computer Design, 1917 Madera St., #8, Waukesha, WI 53186; 414-549-0750; $19.95, plus $3 S/H)

— H. Larry Elman

Home Help CoCo 1, 2 & 3

Envelope Writer

Many computer owners use word processors to handle daily correspondence. Some owners go further by printing return-address labels to affix to the envelope. *Envelope Writer* goes beyond this in an attempt to make it easier to print single envelopes for personal or business mail. Whereas businesses, clubs and other organizations often use mailing-list programs to create many address labels, *Envelope Writer* offers a way to print a return address and a recipient's address on one envelope at a time.

While The Trading Post indicates it carries a CoCo 2 version of *Envelope Writer*, the version we received for review is intended for a CoCo 3 with one disk drive and a Tandy printer. Therefore, specific points made in this review are for the CoCo 3 version only. I assume the CoCo 2 version also works with the CoCo 1, but interested parties should contact The Trading Post for more information.

One problem with printing envelopes on a standard printer involves feeding the envelopes through the printer. As the documentation that comes with *Envelope Writer* makes clear, you should use special tractor-feed envelopes if you are using a dot-matrix printer. These envelopes are available at most office/computer-supply outlets. Most daisy-wheel printers can handle standard envelopes, but it wouldn't hurt to use the tractor-feed envelopes if your daisy wheel can handle it.

Envelopes come in all shapes and sizes.* Envelope Writer *allows for this.

Envelope Writer is written in machine language, which may make it fairly speedy. Of course speed isn't a real concern with this type of program — the limiting factors are that you'll be typing the addresses and the printer can only go so fast, and machine language can't correct these limitations.

Of more immediate concern, the program uses Tandy-specific printer codes for typestyle changes. *Envelope Writer* allows you to independently select from normal, elongated, condensed, elite and bold typestyles for the return and recipient's addresses. If you don't own or use a Tandy printer that supports these codes (newer Tandy printers *don't*), you are limited to whatever typestyles you can manually set with your printer. In addition, both addresses will be in the same typestyle. As the Tandy-specific codes are hard-coded into the machine-language program, it is difficult indeed to alter them, and downright impossible if you are not familiar with disk-editing programs. *Enve-*

lope Writer should include some form of set-up program for those using more-standard printers. If nothing else, it should be written in BASIC so those who know how can edit them at will. Again, speed is not important enough in this case to forego such fundamental flexibility.

As most people know, envelopes come in several different shapes and sizes. *Envelope Writer* does allow for this — the user has control over tab (margin) settings and vertical placement for the return and recipient's addresses. In addition, the vertical spacing required for tractor-feed envelopes is adjustable.

The only spacing problem I encountered was with the tab settings. Different typestyles for the recipient's address cause the address to be printed at different horizontal positions — the program positions the printhead based on the width of characters in the chosen typestyle. I created some pretty unusual-looking envelopes (not to mention wasted a few) because of this. To standardize address placement, *Envelope Writer* should use the "normal" typestyle when adjusting the printhead position, regardless of the chosen style.

After you load and execute the program, the main entry screen appears. It is on this screen that you enter the name and address for the addressee. Upper- and lowercase characters are visible onscreen (at least with the CoCo 3 version). Six lines are provided for the address. Pressing ENTER after the sixth line automatically calls the print routine and, assuming all else is set correctly, the envelope is printed.

Entering a slash at the main entry screen takes you to a menu from which you can set new defaults for the return address, spacing, typestyles to be used for the return and recipient addresses, and printer speed. After you change a default, the system supposedly saves it in a file named FILE.DAT. This appears to be intermittent at best. On several occasions, I changed some defaults (which should have been saved), turned the power off and back on, and reran the program only to find the settings were not exactly as I had left them. (Oh, some were right, but others weren't.) *Envelope Writer* does come with a BASIC program called RESET that sets all defaults back to their original states by creating a new FILE.DAT file.

Envelope Writer offers a way to print a return address and a recipient's address on one envelope at a time.

No provision is made for editing either the return address or the recipient's address. This could be frustrating in situations (home or small business) in which more than one person sends correspondence via the mail. It is sorely missed when entering information for the addressee — if you make a mistake, you *must* start over. And if you press ENTER after that sixth line, your CoCo will faithfully print the envelope, useless as it is.

Along this line, another missing feature is file I/O. You cannot save a database of addresses, which could make this program extremely useful. Nor can you load addresses from a word-processor file.

Computers are great for situations in which they can make a task more efficient. But for the time and trouble involved,

Plug-N-Go...

RAINBOW
NX-1020

This next generation color printer sets new standards in color printer performance... 225 cps, 4 NLQ fonts including Script, plus a new high speed draft font; but the enhancements don't stop there. Add a 16k buffer, a special quiet mode, top feed, bottom and rear tractor, and the list goes on. Seven on-demand colors, 8 color graphics modes, Epson and IBM emulation for maximum software compatibility. Virtually everything desired in a printer is here - *speed, color and versatility* at an affordable price with a 2 year warranty.

OUR *PLUG 'N GO FOR THE COCO* SYSTEM INCLUDES:
- **NX-1020 Rainbow Multi-Font Printer**
- **Blue Streak Ultima**
- **Software Support Disk**
- **Color Super Gemprint**

$249.95 +$10 Shipping & Insurance

This enhanced version of the legendary NX-1000II is the latest low-cost high-performance printer from Star Micronics. Fully featured with 4 NLQ plus a draft font. 10 character sizes from subscript to quadruple size, 4k buffer, 180 cps, friction and tractor feed, and much much more. Backed by a 2 year warranty. Epson and IBM emulation modes for maximum software compatibility. A performer so versatile you may never exhaust it's creative possibilities.

OUR *PLUG 'N' GO FOR THE COCO* SYSTEM INCLUDES:
- **NX-1001 Multi Font Printer**
- **Blue Streak Ultima**
- **Software Support Disk**

$188.88 +$10 Shipping & Insurance

Order Your System Today... Call (513) 885-5999
All Dayton Associate's products have a 30 day moneyback guarantee.

DAYTON ASSOCIATES of W.R. Hall, **INC.**
9644 Quailwood Trail • Spring Valley, Ohio 45370
Shipping charges to Canada, P.R., HI, AK, APO, FPO are double. Triple charge to all other countries.

Visa & Master accepted within the continental U.S.
Ohio residents add 6.5% sales tax
COD add $4.00

Epson is a registered trade mark of Seiko Epson Corp. IBM is a registered trade mark of International Business Machines Corp. Price and Specifications are subject to change without notice.

Envelope Writer offers no advantage over using a word processor for addressing single envelopes. In its current form, I find it difficult to recommend *Envelope Writer* to anyone — especially at its current price.

(Trading Post, P.O. Box 3453, Carbondale, IL 62902-3453; 618-457-5258; $17.95, $3 S/H)

— Cray Augsburg

Utility CoCo 3

BASIC Windows 2.0

BASIC Windows is a great, new program for your 512K CoCo 3 with one or more disk drives. The program is supplied on a single 5¼-inch nonprotected disk, so make a backup copy for safe keeping. The disk contains a BASIC boot program and the 100-percent machine-language windows program. *BASIC Windows* creates either two or four windows that can be used to run up to four separate BASIC programs simultaneously. Don't expect the screen to be divided into two or four windows — you actually get up to four separate screens you use in the normal way. Each screen is identified as Window 1, Window 2, Window 3 or Window 4. You step through each window by pressing the down arrow key and either F (forward) or R (reverse).

To get the program up and running, simply type `RUN "BOOT"` and press ENTER. You are then asked if you want all four windows activated or just two windows. Next, you are asked if you want the windows mirrored. Mirroring a window allows it to communicate with its "mirror." Without this function operating, the programs running in each window are unaware of each other, which can cause programming problems. The last question asks if you want to run the high-speed poke. Since some programs won't run at the higher speed, you have the option of turning it off. Once all three questions have been answered, the main machine-language program loads and automatically executes.

After the title screen appears, you see the first window screen, identified as Window 1. During my experimentation with *BASIC Windows*, I tried the program with *CC3-DOS* and *ADOS-3* — both were fully supported. Just remember to load any operating system other than Disk BASIC before trying to run *BASIC Windows*.

A command in *BASIC Windows 2.0* allows you to lock out a particular window, which gives more processing time to the other active windows. You can also set a window so your printer functions with that particular operating program. The author has wisely provided a priority level function as well by using the command `A=USRS[x]`, where *x* is between 1 and 255. The higher the number, the more priority the CPU gives to the program running in a specific window. This handy function lets you decide which program will have the most priority. If you forget the priority level selected for a program, you can use `A=USR9[0]` for a reminder. If you don't specify a priority level, all operating windows share equal processing time.

The 5-page instruction sheet contains very useful information on techniques you can use to enhance the usefulness of this program. I tried running Radio Shack's *EDTASM* in one window and some BASIC games in three other windows. All of these various programs worked fine. Then, I tried *Mikeyterm* and it locked up the computer. You will have to experiment to see which other machine-language programs run with your computer.

I am impressed with *BASIC Windows*. It works as advertised and provides a great way to capitalize on the extra memory in the CoCo 3. I love the ability to load four of my favorite games and switch between them without having to quit one to play the next. *BASIC Windows* is a program that CoCo 3 users will love to have in their bag of tricks.

(KB Enterprises, 435 Brightwaters Dr., Cocoa Beach, FL 32931; 407-799-3253; $34.95)

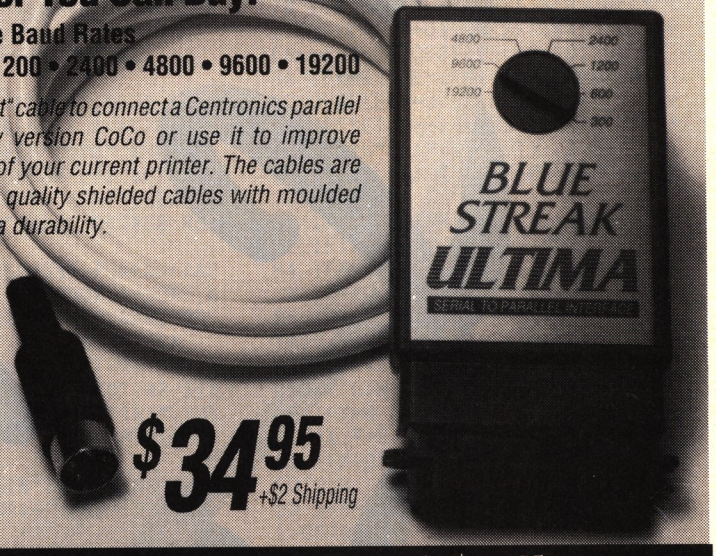
— Jerry Semones

...For the CoCo

The Smallest, Sleekest, Fastest Serial To Parallel Converter You Can Buy!

7 Switchable Baud Rates
300 • 600 • 1200 • 2400 • 4800 • 9600 • 19200

Use this "smart" cable to connect a Centronics parallel printer to any version CoCo or use it to improve performance of your current printer. The cables are long-life, high quality shielded cables with moulded plugs for extra durability.



$34.95 +$2 Shipping

Software Support Disk $19.95
(free with purchase of printer)

TYPE SELECTION/ TUTORIAL
Online instructional program that will select 24 special features of your printer or display methods to incorporate them into your programs

HI-RES SUPER GEMPRINT
Disk software that will transfer a Hscreen 1,2,3 or 4 picture screen to printer. Grey level shading for color.

SUPER GEMPRINT
Will transfer a Pmode 0, 1, 2, 3, or 4 picture screen to printer 8"x11" hardcopy. Black/white, white/black or grey level shading for color.

COLOR SUPER GEMPRINT
Transfers color screens to Color NX-1020. 8"x11" hardcopy in any Pmode or Hscreen mode.

Order Your System Today... Call (513) 885-5999
All Dayton Associate's products have a 30 day moneyback guarantee.

DAYTON ASSOCIATES of W.R. Hall, INC.
9644 Quailwood Trail • Spring Valley, Ohio 45370
Shipping charges to Canada, P.R., HI, AK, APO, FPO are double. Triple charge to all other countries.

Visa & Master accepted within the continental U.S.
Ohio residents add 6.5% sales tax
COD add $4.00

The ultimate shoestring desktop publisher for the CoCo 3

Ultralace:
The Epson Version

by H. Allen Curtis

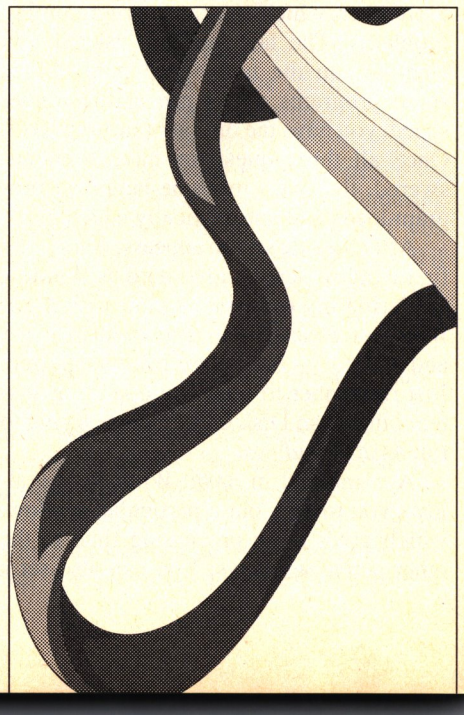
Last month we saw the major listing for *Ultralace*. As explained then, there are two versions of this program: One version is designed for Tandy-standard printers and the other is for Epson/IBM-compatible printers. Because there wasn't room, we printed only the Tandy version last time. This month is devoted to the listing for the Epson version.

Enter the listing for ULE as it appears here, and save it to the *Ultralace* File disk we created before. Then check last month's installment for optional changes you can make. Also, limited instructions for using Ultralace were given last time. Both versions, ULT and ULE, appear on this month's RAINBOW ON TAPE/DISK.

In the Future

We've presented all the listings required for the *Ultralace* desktop-publishing system. In the final installment next month, we'll cover actual operation of *Ultralace*.

In the meantime, three font-file disks are available from me at the address given above: Fonts T through Y ($5), Fonts J through Y ($12), and Fonts A through Y ($19). Please include payment to me by check or money order. ❑



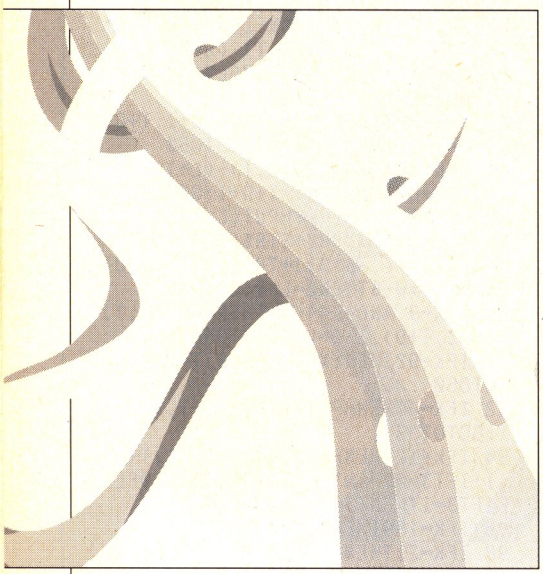
H. Allen Curtis lives in Williamsburg, Virginia. He is interested in 17th and 18th century history and enjoys biking through the colonial capital. He balances past and present with his computer work. He can be contacted at 172 Dennis Drive, Williamsburg, VA 23815, (804) 229-7086. Please include an SASE when requesting a reply.

```
7 ..... 4      19Ø ..... 83     372 ..... 148
1Ø ..... 176   212 ..... 126    38Ø ..... 4
16 ..... 1Ø4   222 ..... 158    39Ø ..... 114
26 ..... 2Ø9   238 ..... 13     4ØØ ..... 1Ø
34 ..... 77    248 ..... 189    41Ø ..... 76
52 ..... 2ØØ   26Ø ..... 3     422 ..... 96
7Ø ..... 89    272 ..... 195    436 ..... 192
8Ø ..... 1     292 ..... 92     446 ..... 253
94 ..... 16    3Ø4 ..... 94     458 ..... 9Ø
1Ø4 ..... 63   312 ..... 72     474 ..... 198
122 ..... 14   318 ..... 235    482 ..... 2Ø6
13Ø ..... 4    328 ..... 125    496 ..... 15
142 ..... 145  338 ..... 148    5Ø6 ..... 46
154 ..... 6Ø   35Ø ..... 169    END ..... 24
168 ..... 21   36Ø ..... 153
```

The Listing: ULE

```
1 PCLEAR1:CLEAR6000:CMP:WIDTH40:
CLS3:GOSUB410:W=640:H=3:F1$="ABC
DEFGH":PF=VARPTR(F1$):PF=256*PEE
K(PF+2)+PEEK(PF+3):GOTO15
2 P$=RIGHT$(STR$(I),1)+"/HR1":Q$
=RIGHT$(STR$(I),1)+"/HR2":RETURN
3 RENAMEF$+"L"+P$TO"L1/BIN":RENA
MEF$+"L"+Q$TO"L2/BIN":RETURN
4 POKE&HFFA2,&H70:LOADM"L1":POKE
&HFFA2,&H71:LOADM"L2":RETURN
5 RENAME"L1/BIN"TOF$+"L"+P$:RENA
ME"L2/BIN"TOF$+"L"+Q$:RETURN
6 FORI=0TO29:POKEI+&H1321,PEEK(K
+I):NEXT:RETURN
7 K=&H135F:GOSUB6:POKE&H127F,1:P
OKE&H1283,&H50:POKE&H12DE,0:POKE
&H1263,&H10:POKE&H1280,&H21:GOSU
B404:FORI=1TO4:GOSUB2:GOSUB3:GOS
UB4:POKE&HFFA2,&H7A:GOSUB5:EXEC&
H12CB:NEXT:RETURN
8 K=&H1341:GOSUB6:POKE&H127F,&H1
5:POKE&H1283,&H3C:POKE&H12DE,0:P
OKE&H1263,0:POKE&H1280,&H1E:GOSU
B404:FORI=1TO4:GOSUB2:GOSUB3:REN
AMEF$+"R"+P$TO"R1/BIN":RENAMEF$+
"R"+Q$TO"R2/BIN"
9 GOSUB4:POKE&HFFA2,&H72:LOADM"R
1":POKE&HFFA2,&H73:LOADM"R2":POK
E&HFFA2,&H7A:GOSUB5:RENAME"R1/BI
N"TOF$+"R"+P$:RENAME"R2/BIN"TOF$
+"R"+Q$:EXEC&H12CB:NEXT:RETURN
10 K=&H1341:GOSUB6:POKE&H127F,&H
29:POKE&H1283,&H28:POKE&H12DE,&H
12:POKE&H1280,&H1E:GOSUB404:FORI
=1TO4:P$=RIGHT$(STR$(I),1)+"/HR"
:RENAMEF$+"L"+P$TO"L/BIN":RENAME
F$+"M"+P$TO"M/BIN":RENAMEF$+"R"+
P$TO"R/BIN"
11 POKE&HFFA2,&H70:LOADM"L":POKE
&HFFA2,&H71:LOADM"M":POKE&HFFA2,
&H72:LOADM"R":POKE&HFFA2,&H7A:RE
NAME"L/BIN"TOF$+"L"+P$:RENAME"M/
BIN"TOF$+"M"+P$:RENAME"R/BIN"TOF
$+"R"+P$:EXEC&H12CB:NEXT
12 POKE&HFFA2,&H72:LOADM"DMENU/H
R1:0":POKE&HFFA2,&H7A:RETURN
13 '
14 '
15 HCOLOR3,0:ON BRK GOTO332
16 LOADM"MLR":POKE&HFFA2,&H70:LO
ADM"DMENU/HR1":POKE&HFFA2,&H71:L
OADM"DMENU/HR2":POKE&HFFA2,&H77:
LOADM"FMENU/HR1":POKE&HFFA2,&H7A
:EXEC&HF00
17 POKE150,18:POKE55455,65:POKE5
5456,66:POKE55232,0:POKE55318,20
18 ON ERR GOTO22
20 K$=K$+"C":A1=PEEK(VARPTR(K$)+
2):A2=PEEK(VARPTR(K$)+3):IFA2<2T
HENA2=254:A1=A1-1:GOTO36ELSEA2=A
2-2:GOTO36
22 POKE&HFFA2,&H7A:GOTO492
24 '
26 GOSUB384:POKE&HFFA2,&H70:SAVE
M"OUT1",&H4000,&H5FFF,&HAC73:POK
E&HFFA2,&H71:SAVEM"OUT2",&H4000,
&H5BFF,&HAC73:POKE&HFFA2,&H7A:RE
NAME"OUT1/BIN"TOF$+"/HR1":RENAME
"OUT2/BIN"TOF$+"/HR2":DRIVE0:RET
URN
28 EXEC&HF3C:GOSUB384:POKE&HFFA2
,&H70:SAVEM"OUT",&H4000,&H5DFF,&
HAC73:POKE&HFFA2,&H7A:RENAME"OUT
/BIN"TOF$+"/HR":DRIVE0:RETURN
30 GOSUB404:RENAMEF$+"/HR1"TO"IN
1/BIN":RENAMEF$+"/HR2"TO"IN2/BIN
":POKE&HFFA2,&H70:LOADM"IN1":POK
E&HFFA2,&H71:LOADM"IN2":POKE&HFF
A2,&H7A
32 RENAME"IN1/BIN"TOF$+"/HR1":RE
NAME"IN2/BIN"TOF$+"/HR2":DRIVE0:
RETURN
34 GOSUB404:RENAMEF$+"/HR"TO"IN/
BIN":POKE&HFFA2,&H70:LOADM"IN":P
OKE&HFFA2,&H7A:RENAME"IN/BIN"TOF
$+"/HR":DRIVE0:EXEC&HF71:RETURN
36 L2=1:P=176:DIMF$(84),M(84):PO
KE&HFFD9,0
38 C1=63:PALETTE0,63:PALETTE1,63
:PALETTE2,63:PALETTE3,0
40 EXEC&H1000:POKE&HE6E4,&HE6:HS
CREENH:POKE&HE6E4,&HE7:HBUFF1,39
9:HGET(8,152)-(9,152+D),1
42 HBUFF4,3200:HBUFF5,2104:HGET(
0,0)-(639,19),4:HBUFF6,1520
44 EXEC&HF00:HGET(48,16)-(63,31)
,5:EXEC&HF00:DX=16:DY=16
46 PALETTE1,0
48 T=V:L=U:K$="F":GOTO138
50 IFZ=U AND L+4>W-1THENL=U:IFT<
P THENT=T+D+1
52 IFZ<>U AND L+4>W-1THENFL=1:GO
TO112
54 HGET(L,T)-(L+1,T+D),1:HLINE(L
,T)-(L+1,T+D),PSET,BF
56 POKE&H23,A1:POKE&H24,A2
58 IFSCI=1THEN420ELSEIFSCI=2 AND
 KS=1THEN428ELSEIFSCI=2THEN432
60 K$=INKEY$:IFK$=""THEN60
62 K=ASC(K$):IFK>64 AND K<91THEN
N=K-64:B=N:HLINE(L,T)-(L+1,T+D),
PRESET,BF:GOTO106
64 IFK>96 AND K<123THENN=K-96:B=
N+26:GOTO106
66 IFK>47 AND K<58THENN=K-47:B=N
+52:GOTO106
68 IFK>32 AND K<48THENN=K-32:B=N
+62:GOTO106
70 IFK>57 AND K<65THENN=K-57:B=N
+77:GOTO106
72 IFK=32THENZ=L+S:IFL+8<W THENH
LINE(L,T)-(L+7,T+D),PRESET,BF:L=
L+S:GOTO50ELSEHLINE(L,T)-(L+1,T+
D),PRESET,BF:L=U:IFT<P AND T<191
-2*D THENT=T+1+D:GOTO50ELSEFL=0:
GOTO444
74 IFK=13THENHPUT(L,T)-(L+1,T+D)
,1:L=U
76 IFK=13 AND T<P THENT=T+1+D:GO
TO54ELSEIFK=13THEN54
78 IFK=8THENL=2*INT(.5*L):HLINE(
L,T)-(L+1,T+D),PRESET,BF:IFL>1TH
ENL=L-2:GOTO50ELSEL=0:GOTO50
80 IFK=93THENIFH=1THENSOUND60,9:
GOTO50ELSEZ=U:HLINE(L,T)-(L+1,T+
D),PRESET,BF:IFL+DX-1<W THENL=8*
INT(.125*L):HPUT(L,T)-(L+DX-1,T+
DY-1),5:L=L+DX:GOTO50ELSESOUND60
,9:GOTO50
82 IFK=94THENHPUT(L,T)-(L+1,T+D)
,1:IFT>D THENT=T-1-D:GOTO50
84 IFK=10THENHPUT(L,T)-(L+1,T+D)
,1:IFT+D<191THENT=T+D+1:GOTO50
86 IFK=91THENZ=U:HPUT(L,T)-(L+1,
T+D),1:HDRAW"BM"+STR$(L)+","+STR
$(T+1+INT(.75*D))+"R4":L=L+4:GOT
O50:IFL>W-5THENL=L-4:GOTO50
88 IFK=9 AND L+4<W THENHPUT(L,T)
-(L+1,T+D),1:L=L+4:GOTO50
90 IFK=92THENEXEC&H1000:T=V:L=U:
GOTO50
92 IFK=4THENHPUT(L,T)-(L+1,T+D),
1:GOTO128
94 IFK=12THENHPUT(L,T)-(L+1,T+D)
,1:IFT3=0THENT3=1:L=T1:GOTO50ELS
EIFT3=1THENT3=0:L=T2:GOTO50
96 IFK=189THENGOSUB374
98 IFK=21THENHPUT(U,T)-(W-1,T+.5
*D),4:HPUT(U,T+.5*D)-(W-1,T+D),4
:L=U:GOTO50
100 IFK=95THENI=2*H+2:HPUT(L,T)-
(L+1,T+D),1:IFL>W*.5THENHGET(U,T
)-(W-I-1,T+.5*D+.5),6:HPUT(U+I,T
)-(W-1,T+.5*D+.5),6:HGET(U,T+.5*
D+1.5)-(W-I-1,T+D),6:HPUT(U+I,T+
.5*D+1.5)-(W-1,T+D),6:GOTO104
102 IFK=95THENHGET(U+I,T)-(W-1,T
+.5*D+.5),6:HPUT(U,T)-(W-1-I,T+.
5*D+.5),6:HGET(U+I,T+.5*D+1.5)-(
```

```
W-1,T+D),6:HPUT(U,T+.5*D+1.5)-(W
-1-I,T+D),6
104 IFK<>95THENHPUT(L,T)-(L+1,T+
D),1:GOTO50ELSE50
106 HLINE(L,T)-(L+1,T+D),PRESET,
BF:IFL+M(B)<W THENGOSUB126:L=L+2
*INT(.5+M(B)*.5)+2:IFL>W-1THENL2
=L-W+1:L=W-1:GOTO50ELSE50
108 IFZ=U THENL=U:IFT<P AND T<19
1-2*D THENT=T+D+1:GOTO62ELSE62
110 FL=2
112 IFH=3THENZ1=8*INT(.125*Z)
114 IFH=1THENZ1=4*INT(.25*Z)
116 Z=Z1
118 HGET(Z,T)-(L,T+D),6:HPUT(Z,T
)-(L,T+D),4:L1=L-Z:L=U:Z=U:IFT<P
 AND T<191-2*D THENT=T+D+1ELSE44
4
120 IFL+L1<ØTHENL1=L1+2:GOTO120
122 IFSCI<>2THENHPUT(L,T)-(L+L1,
T+D),6:L=L+L1+L2:L=2*INT(.5*L+.5
):L2=ØELSEL=U:GOSUB476:KS=KS+1:G
OTO432
124 N=FL+1:ON N GOTO50,54,62
126 HDRAW''BM''+STR$(L)+'',''+STR$(T
)+F$(B):RETURN
128 HSCREENØ:CLS:ATTRØ,4:LOCATE1
Ø,4:PRINT''A: ART-DESIGNS'':LOCATE
1Ø,5:PRINT''B: BACK TO SCREEN'':LO
CATE1Ø,6:PRINT''C: CONVERT WPF'':L
OCATE1Ø,7:PRINT''D: DIR'':LOCATE1Ø
,8:PRINT''F: FONT SELECT
130 LOCATE1Ø,9:PRINT''H: HOUSEKEE
PING'':LOCATE1Ø,1Ø:PRINT''I: INPUT
'':LOCATE1Ø,11:PRINT''K: KEYS LIST
ED'':LOCATE1Ø,12:PRINT''M: MARGIN
 SET'':LOCATE1Ø,13:PRINT''O: OUTPUT
'':LOCATE1Ø,14:PRINT''P: PRESENT S
TATUS
132 LOCATE1Ø,15:PRINT''R: RESOLUT
```



```
ION CHANGE'':LOCATE1Ø,16:PRINT''S:
 SCREEN DUMP'':LOCATE1Ø,17:PRINT''
T: TAB SET'':LOCATE1Ø,18:PRINT''X:
 EXIT UltraLace'':LOCATE14,18:POK
E&H23,A1:POKE&H24,A2:POKE&HFFD8,
Ø
134 K$=INKEY$:IFK$=''''THEN134
136 IFK$=''D'' OR K$=''d''THENGOSUB3
26:GOTO128
138 IFK$=''F'' OR K$=''f''THENOD=D:L
1=L:EXEC&HF8E:POKE&HE6E4,&HE6:HS
CREEN3:POKE&HE6E4,&HE7:GOSUB17Ø:
L=L1:EXEC&HF8E:GOTO128
140 IFK$=''B'' OR K$=''b''THEN168
142 IFK$=''H'' OR K$=''h''THENGOSUB3
24:GOTO396
144 IFK$=''I'' OR K$=''i''THEN482
146 IFK$=''K'' OR K$=''k''THENGOSUB3
Ø8:GOTO128
148 IFK$=''O'' OR K$=''o''THENIFCC=Ø
 AND HK=ØTHEN348ELSEIFCC=ØTHEN34
6ELSEF$=LEFT$(F1$,HL):DRIVEVAL(R
IGHT$(F$,1)):F$=LEFT$(F$,HL-2):I
FHK=3THENCLS:GOSUB28:GOTO128ELSE
CLS:GOSUB26:GOTO128
150 IFK$=''M'' OR K$=''m''THENGOSUB2
18:GOTO128
152 IFK$=''P'' OR K$=''p''GOSUB4ØØ:G
OTO128
154 IFK$=''R'' OR K$=''r''THENIFH=1T
HENH=3:U=2*U:W=2*W:T1=2*T1:T2=2*
T2:GOTO128ELSEH=1:U=.5*U:W=.5*W:
T1=.5*T1:T2=.5*T2:GOTO128
156 IFK$=''T'' OR K$=''t''THENGOSUB2
98:GOTO128
158 IFK$=''C'' OR K$=''c''THEN252
160 IFK$=''S'' OR K$=''s''THENGOSUB3
24:GOSUB322:IFK$=''1"THENGOSUB7:G
OTO128ELSEIFK$=''2"THENGOSUB8:GOT
O128ELSEIFK$=''3"THENPOKE&H13FF,Ø
:GOSUB1Ø:GOTO128ELSESOUND6Ø,9:GO
TO128
162 IFK$=''A'' OR K$=''a''THEN33Ø
164 IFK$=''X'' ORK$=''x''THENGOSUB39
4:IFK$=''Y'' OR K$=''y''THENCLS3:POK
E&HFFD8,Ø:DRIVEØ:ENDELSE128
166 SOUND6Ø,5:SOUND6Ø,5:GOTO128
168 POKE&HE6E4,&HE6:HSCREENH:POK
E&HE6E4,&HE7:POKE&HFFD9,Ø:GOTO2Ø
2
17Ø GOTO2Ø4
172 POKE&H23,A1:POKE&H24,A2:GOSU
B322
174 IFK$<''Ø'' OR K$>''9" THENSOUND
6Ø,1Ø:RETURNELSEK$=''1"+K$
176 GOSUB212
178 GOSUB216
18Ø OPEN''I'',#1,''FONT''+K$
182 FORI=1TO84:LINEINPUT#1,F$(I)
:NEXT
184 FORI=1TO84:INPUT#1,M(I):NEXT
186 INPUT#1,D,S:CLOSE#1:IFD>7 AN
D D<11THEND=11ELSEIFD>11 AND D<1
5THEND=15ELSEIFD>15THEND=23
188 K=T
19Ø T=T+INT(.5*(OD-D)):V=T:IFT<Ø
THENT=Ø:V=ØELSEIFT>P THENT=P-1
192 IFV>=ØTHENV=V-D-1:GOTO192ELS
EV=V+D+1
194 IFK=ØTHENGOSUB424:GOSUB25Ø
196 RETURN
198 HPUT(16,2Ø)-(111,17Ø),5
2ØØ GOSUB25Ø
2Ø2 HGET(L,T)-(L+1,T+D),1:GOTO5Ø
2Ø4 POKE&H23,A1:POKE&H24,A2:GOSU
B322
206 K=ASC(K$):IFK>96 AND K<122TH
ENK=K-32:K$=CHR$(K)
2Ø8 IFK>64 AND K<9ØTHEN176ELSESO
UND6Ø,9:GOTO2Ø4
21Ø POKE&H23,A1:POKE&H24,A2:RETU
RN
212 POKE&H23,A1-1:POKE&H24,A2:RE
TURN
214 POKE&H23,A1-2:POKE&H24,A2:RE
TURN
216 POKE&H23,A1-4:POKE&H24,A2:RE
TURN
218 GOSUB212:CLS:LOCATE6,8:PRINT
''ENTER TOP MARGIN (Ø - 1Ø): '';:L
INEINPUTV$:LOCATE6,1Ø:PRINT''ENTE
R LEFT MARGIN '';:IFV$=''''THENV$=S
TR$(V)
22Ø LOCATE24,1Ø:IFH=1THENPRINT''(
Ø - 2ØØ):    '':LOCATE35,1ØELSEP
RINT''(Ø - 4ØØ):    '':LOCATE35,1
Ø
222 GOSUB214:LINEINPUTU$:GOSUB3Ø
6:V=VAL(V$):U=VAL(U$):IFH=1THENU
=4*INT(.25*U):Z=U ELSEU=8*INT(.1
25*U):Z=U
224 IFV<ØTHENV=Ø
226 IFV>1ØTHENV=1Ø
228 IF U>W-5ØTHENSOUND6Ø,5:LOCAT
E1Ø,15:PRINT''LEFT MARGIN TOO BIG
'':LOCATE8,16:PRINT''RELATIVE TO R
IGHT MARGIN!'':LOCATE14,17:PRINT''
TRY AGAIN.'':GOTO22Ø
23Ø IFU<ØTHENU=Ø
232 IFH=1 AND U>2ØØTHENU=2ØØ
234 IFH=3 AND U>4ØØTHENU=4ØØ
236 GOSUB212:LOCATE4,12:PRINT''EN
TER RIGHT MARGIN ( Ø -'';32Ø+(H-1
)*16Ø;''): '';:LINEINPUTW$:IFW$=''''
THENW$=STR$(W)
238 W=VAL(W$):IFW<U+5ØTHENSOUND6
Ø,5:LOCATE9,15:PRINT''RIGHT MARGI
N TOO SMALL'':LOCATE8,16:PRINT''RE
LATIVE TO LEFT MARGIN. '':LOCATE1
4,17:PRINT''TRY AGAIN.'':GOTO236
24Ø GOSUB29Ø
242 CLS:LOCATE6,12:PRINT''DO YOU
WANT TO CHANGE THE'':LOCATE6,13:P
RINT''BOTTOM MARGIN? (Y/N) '';
244 GOSUB322:IFK$=''N'' OR K$=''n''
OR ASC(K$)=13THENL=U:T=V:RETURNE
LSEIFK$=''Y'' OR K$=''y''THEN246ELSE
SOUND6Ø,5:GOTO244
246 LOCATE6,16:PRINT''DO YOU WANT
 IT AT THE MOST'':LOCATE6,17:PRIN
T''RECENT CURSOR POSITION? (Y/N)
 '':LOCATE6,18:PRINT''IF NOT, IT W
ILL BE SET TO THE'':LOCATE6,19:PR
INT''LOWEST POSSIBLE CURSOR POSIT
ION.'':LOCATE37,17
248 GOSUB322:IFK$=''N'' OR K$=''n''T
HENGOSUB424:GOTO25ØELSEIFK$=''Y''
OR K$=''y''THENP=T:L=U:T=V:RETURNE
LSESOUND65,Ø:GOTO248
25Ø P=V+(D+1)*(-1+INT((192-V)/(D
+1))):RETURN
252 GOSUB212:CLS:LOCATE5,8:PRINT
''FILENAME INCLUDING EXTENSION:'':
LOCATE13,9:LINEINPUTF$:Z$=RIGHT$
(F$,2):IFASC(Z$)=58THENDRIVEVAL(
RIGHT$(Z$,1)):F$=LEFT$(F$,LEN(F$
)-2)ELSEDRIVEØ
254 N=INSTR(F$,''/''):IFN=ØTHEN252
ELSEG$=LEFT$(F$,N)+''DAT''
256 J=Ø:IFRIGHT$(F$,3)=''DAT''THEN
RENAMEF$TOLEFT$(F$,N)+''TXT'':F$=L
EFT$(F$,N)+''TXT''
258 OPEN''D'',#1,F$:FIELD#1,128 AS
 A$,128 AS B$
26Ø CLOSE#2:OPEN''O'',#2,G$
262 IFDN=1THEN288ELSEGOSUB21Ø:J=
J+1:GET#1,J:C$=A$
264 B=INSTR(B$,'']''):IFINSTR(A$,''
]'')>Ø OR B>ØTHENDN=1:IFB>ØTHENB$
=LEFT$(B$,B-1)ELSEC$=LEFT$(C$,IN
STR(C$,'']'')-1):B$=''''
266 N=INSTR(C$,CHR$(13)):IFN>ØTH
ENGOSUB286:C$=RIGHT$(C$,LEN(C$)-
```

DELPHI'S 20/20 ADVANTAGE, VISIBLY SUPERIOR

$20

$124

$120-$256

COST OF 20 EVENING HOURS OF DOWNLOADS AND CHAT

On DELPHI's 20/20 Advantage Plan, you get 20 hours of connect time each month for only $20. Additional time is only 2 cents/minute. No other full-featured online service even comes close!

And those are 20 hours of real online fun and productivity. Download files, chat with friends, send electronic mail, play multi-player games, and make travel reservations.

Join DELPHI now for only $39.95 and your first 20 hours are free. With your CoCo and modem:

- Dial 1-800-365-4636
- At *Username:* type **JOINDELPHI**
- At *Password:* type **COCO20**

DELPHI

THE WORLD'S PREMIER ONLINE INFORMATION SERVICE

800-544-4005 • 617-491-3393

Already a DELPHI member? Type **GO USING ADVANTAGE**

```
N):IFC$=""THENC$=B$:GOTO270ELSE2
66
268 GOSUB276:C$=C$+B$
270 N=INSTR(C$,CHR$(13)):IFN>0TH
ENGOSUB286:C$=RIGHT$(C$,LEN(C$)-
N):IFC$=""THEN262ELSE270
272 GOSUB276:IFDN=1THEN288ELSEGO
SUB210:J=J+1:GET#1,J:C$=C$+A$
274 GOTO264
276 I=1
278 IFLEN(C$)=I OR C$=STRING$(LE
N(C$),32)THENK=0:GOTO284
280 K=INSTR(LEN(C$)+1-I,C$," "):
IFK=0THENI=I+1:GOTO278
282 PRINT#2,LEFT$(C$,K-1)
284 C$=RIGHT$(C$,LEN(C$)-K):RETU
RN
286 IFLEFT$(C$,N)=CHR$(13)THENPR
INT#2," [":RETURNELSEPRINT#2,LEF
T$(C$,N-1):RETURN
288 CLOSE#1:PRINT#2,C$:CLOSE#2:D
RIVE0:DN=0:GOTO128
290 IFH=1 AND W>320THENW=320
292 IFW>640THENW=640
294 IFH=1THENW=4*INT(.25*W)ELSEW
=8*INT(.125*W)
296 RETURN
298 GOSUB212:CLS:LOCATE6,8:PRINT
"ENTER 1ST TAB VALUE: ";:LINEINP
UTT$:GOSUB304:T1=2*INT(VAL(T$)*.
5):IFH=1 AND T1>320THENT1=320ELS
EIFT1>640THENT1=640
300 GOSUB212:LOCATE6,12:PRINT"EN
TER 2ND TAB VALUE: ";:LINEINPUTT
$:GOSUB304:T2=2*INT(VAL(T$)*.5):
IFH1 AND T2>320THENT2=320ELSEIFT
2>640THENT2=640
302 RETURN
304 IFT$="c" OR T$="C" THENT$=ST
R$(L):RETURNELSERETURN
306 IFU$=""THENU$=STR$(U):RETURN
ELSERETURN
308 CLS:LOCATE2,2:PRINT"F2:
     CALL COMMAND MENU":LOCATE2,
3:PRINT"RIGHT ARROW: MOVE CURSOR
 RIGHT":PRINT"  LEFT ARROW:  BAC
KSPACE":PRINT"  UP ARROW:    MOV
E CURSOR UP 1 LINE":PRINT"  DOWN
 ARROW:  MOVE CURSOR DOWN 1 LINE
310 LOCATE2,7:PRINT"ENTER:
 CARRIAGE RETURN &":LOCATE15,8:P
RINT"MOVE CURSOR DOWN 1 LINE":PR
INT"  CLEAR:       TAB":LOCATE7,
11:ATTR0,4,U:PRINT"KEYS WITH SHI
FT HELD DOWN";:ATTR0,4
312 LOCATE2,13:PRINT"RIGHT ARROW
: DRAW CLIP ART":PRINT"  LEFT AR
ROW:  CLEAR LINE":PRINT"  UP ARR
OW:    MOVE CHAR-LINE TOWARD":LO
CATE15,16:PRINT"CURSOR HALF OF S
CREEN":PRINT"  DOWN ARROW:  UNDE
RLINE":PRINT"  CLEAR:       CLEA
R SCREEN
314 PRINT"  0:          UPPER/L
OWER CASE":LOCATE4,22:ATTR0,4,U:
PRINT"PRESS SPACE FOR REST OF KE
Y LIST";:ATTR0,4:LOCATE4,22:E$="
       STOPPED BY ANY KEY OR MA
RGIN":GOSUB322
316 CLS:LOCATE6,5:ATTR0,4,U:PRIN
T"KEYS PRESSED AFTER CTRL KEY";:
ATTR0,4:LOCATE2,7:PRINT"RIGHT AR
ROW: MOVE CURSOR RIGHT UNTIL"+E$
:PRINT"  LEFT ARROW:  MOVE CURSO
R LEFT UNTIL "+E$
318 LOCATE2,11:PRINT"UP ARROW:
  MOVE CURSOR UP UNTIL  "+E$:PR
INT"  DOWN ARROW:  MOVE CURSOR D
OWN UNTIL "+E$
320 LOCATE5,22:PRINT"PRESS ";:AT
TR0,4,U:PRINT"SPACE";:ATTR0,4:PR
INT" TO RETURN TO MENU";:LOCATE1
2,22
322 K$=INKEY$:IFK$=""THEN322ELSE
RETURN
324 CLS:LOCATE8,10:PRINT"1: 1COL
UMN/4SCREEN":LOCATE8,11:PRINT"2:
 2COLUMN/8SCREEN":LOCATE8,12:PRI
NT"3: 3COLUMN/12SCREEN":RETURN
326 GOSUB212:CLS:LOCATE12,8:PRIN
T"DRIVE NUMBER: "
328 GOSUB322:K=VAL(K$):IFK>3THEN
SOUND60,9:GOTO328ELSEDIRK:PRINT"
  FREE GRANULES:";FREE(K):PRINT"
     PRESS SPACE TO CONTINUE":GO
SUB322:RETURN
330 CLS:LOCATE10,8:PRINT"1: NORM
AL":LOCATE10,9:PRINT"2: DOUBLE W
IDTH":LOCATE10,10:PRINT"3: DOUBL
E WIDTH-LENGTH":LOCATE10,11:MI$=
": MIRROR IMAGE OF ":PRINT"4";MI
$;"1":LOCATE10,12:PRINT"5";MI$;"
2":LOCATE10,13:PRINT"6";MI$;"3":
GOTO354
332 GOSUB394:IFK$="Y" OR K$="y"T
HEN334ELSE128
334 CLS3:POKE&HFFD8,0:DRIVE0
336 IFERNO>-1 AND PEEK(&H13FF)<>
9THENPOKE&HFFA1,121:POKE&HFFA2,1
22ELSEEND
338 IFERNO<25THENAD=&HABAF+ERNO*
2ELSEIFERNO>26THENAD=&HC290+2*(E
RNO-27)ELSEAD=&H890D
340 WIDTH40:LOCATE8,10:PRINT" ";
:PRINTCHR$(PEEK(AD))CHR$(PEEK(AD
+1));" ERROR IN LINE";ERLIN
342 LOCATE12,14:PRINT"CONTINUE?
(Y,N)":GOSUB322:IFK$="Y" OR K$="
y"THENWIDTH40:CLS5:PALETTE0,63:P
ALETTE1,0:GOTO128
344 END
346 GOSUB404:IFHK=3THENGOSUB28:G
OTO128ELSEGOSUB26:GOTO128
348 CLS:LOCATE8,10:PRINT"1: SAVE
 FULL SCREEN":LOCATE8,12:PRINT"2
: SAVE HALF SCREEN"
350 GOSUB322:IFK$="1"THENGOSUB40
4:GOSUB26:GOTO128ELSEIFK$="2"THE
NGOSUB404:GOSUB28:GOTO128ELSESOU
ND60,9:GOTO128
352 GOSUB322:GOTO128
354 GOSUB322:K=VAL(K$):IFK<1 OR
K>6THENSOUND60,9:GOTO354ELSEIFK>
3THENPOKE&H102A,1:K=K-3ELSEPOKE&
H102A,0
356 DK=K:POKE&H1027,K:CLS:EXEC&H
F00:POKE&HE6E4,&HE6:HSCREEN3:POK
E&HE6E4,&HE7
358 GOSUB322:K=ASC(K$):IFK<48 OR
 K>51THENSOUND60,9:GOTO358ELSEK=
K-48:DX=(K+1)*16:POKE&H1028,2*K+
3:IFK>0THEN368
360 GOSUB322:K=ASC(K$):IFK>96 AN
D K<123THENK=K-97ELSEIFK>64 AND
K<77THENK=K-39ELSESOUND60,9:GOTO
360
362 POKE&H1029,K:EXEC&H1033:IFDX
>48THENDX=48
364 DY=DX:IFDK>1THENDX=2*DX:IFDK
=3THENDY=DX
366 IFPEEK(&H102A)=0THENGET(544
,96)-(543+DX,95+DY),5:HSCREEN0:E
XEC&HF00:GOTO128ELSEHGET(640-DX,
96)-(639,95+DY),5:HSCREEN0:EXEC&
HF00:GOTO128
368 IF K>1THEN372
370 GOSUB322:K=ASC(K$):IFK>96 AN
D K<116THENK=K-97:GOTO362ELSESOU
ND60,9:GOTO370
372 GOSUB322:K=ASC(K$):IFK>96 AN
D K<107THENK=K-97:GOTO362ELSESOU
ND60,9:GOTO372
374 GOSUB322:K=ASC(K$):IFK=8THEN
378ELSEIFK=10THEN380ELSEIFK=94TH
EN382
376 K$=INKEY$:IFL+4<W AND K$=""T
HENHPUT(L,T)-(L+1,T+D),1:L=L+4:H
GET(L,T)-(L+1,T+D),1:HLINE(L,T)-
(L+1,T+D),PSET,BF:GOTO376ELSERET
URN
378 K$=INKEY$:IFL-4>U AND K$=""T
HENHPUT(L,T)-(L+1,T+D),1:L=L-4:H
GET(L,T)-(L+1,T+D),1:HLINE(L,T)-
(L+1,T+D),PSET,BF:GOTO378ELSERET
URN
380 K$=INKEY$:IFT+D<191 AND K$="
"THENHPUT(L,T)-(L+1,T+D),1:T=T+D
+1:HGET(L,T)-(L+1,T+D),1:HLINE(L
,T)-(L+1,T+D),PSET,BF:GOTO380ELS
ERETURN
382 K$=INKEY$:IFT-D>0 AND K$=""T
HENHPUT(L,T)-(L+1,T+D),1:T=T-D-1
:HGET(L,T)-(L+1,T+D),1:HLINE(L,T
)-(L+1,T+D),PSET,BF:GOTO382ELSER
ETURN
384 IFHK=0THENRETURN
386 F$=F$+CHR$(HS)+RIGHT$(STR$(H
F),1):HR=HR+1:HF=HF+1:IFHR=5THEN
HF=1:IFHK=1THENHK=0:CC=0:RETURNE
LSEIFHK=2THENHS=82:U=8:W=416:GOS
UB516ELSEHS=77:U=16:W=304:GOSUB5
16
388 IFHR=9THENHF=1:IFHK=2THENHK=
0:CC=0:RETURNELSEHS=82:U=0:W=288
:GOSUB516
390 IFHR=13THENHK=0:CC=0:RETURN
392 V=0:L=U:T=V:GOTO250
394 CLS:LOCATE10,10:PRINT"ARE YO
U SURE? (Y/N) ":GOTO322
396 GOSUB322:IFK$<"1" OR K$>"3"T
HENSOUND60,8:GOTO128ELSEHF=1:HR=
1:HS=76:IFK$="1"THENHK=1:U=0:W=6
40ELSEIFK$="2"THENHK=2:U=64:W=47
2ELSEHK=3:U=32:W=320
398 GOSUB516:GOSUB392:HF=1:GOTO1
28
400 CLS:LOCATE11,8:PRINT"TOP MAR
GIN =";V:LOCATE11,9:PRINT"LEFT M
ARGIN =";U:LOCATE11,10:PRINT"RIG
HT MARGIN =";W:LOCATE11,11:PRINT
"BOTTOM MARGIN =";P+D:LOCATE11,1
2:PRINT"TAB1 =";T1:LOCATE11,13:P
RINT"TAB2 =";T2
402 GOTO320
404 GOSUB212:CLS:LOCATE12,8:PRIN
T"FILENAME: ";:LINEINPUTF$:Z$=RI
GHT$(F$,2):Z1$=Z$:IFASC(Z$)=58TH
ENDRIVEVAL(RIGHT$(Z$,1)):F$=LEFT
$(F$,LEN(F$)-2)ELSEZ$=":0"
406 IFHK=0 OR I1=1THENRETURNELSE
HL=LEN(F$)+2:IFHL>8THENF$=LEFT$(
F$,6):HL=8
408 CC=1:FORI=1TOHL:POKEPF-1+I,A
SC(MID$(F$+Z$,I,1)):NEXT:RETURN
410 LOCATE15,4:ATTR3,2,U:PRINT"U
ltraLace";:ATTR2,2:LOCATE8,6:PRI
NT"THE ULTIMATE SHOESTRING":LOCA
TE11,8:PRINT"DESKTOP PUBLISHER":
```

```
ATTR3,2:LOCATE11,12:PRINT"BY H.
Allen Curtis":LOCATE13,14:PRINT"
COPYRIGHT 1990":LOCATE16,4:ATTR3
,2:RETURN
412 CLS:ATTR0,4:OPEN"I",#1,"STR"
:FORI=1TO6:LINEINPUT#1,AC$:LOCAT
E4,7+I:PRINTAC$:NEXT
414 GOSUB212:K$=INKEY$:IFK$=""TH
EN414ELSEIFK$>"6" OR K$<"1"THENS
OUND60,5:GOTO414
416 SK=VAL(K$):KS=1
418 FORI=1TOSK:LINEINPUT#1,AC$:N
EXT:CLOSE#1:RETURN
420 POKE&H23,A1:POKE&H24,A2:IFKS
<=LEN(AC$)THENK$=MID$(AC$,KS,1):
KS=KS+1:GOSUB422:GOTO62ELSESCI=0
:HPUT(L,T)-(L+1,T+D),1:U=UT:GOTO
50
422 IFASC(K$)=94THENK$=CHR$(13):
RETURNELSERETURN
424 V=192-(D+1)*INT(192/(D+1)):T
=V:RETURN
426 IFH=1THENU=4*INT(.25*L):RETU
RNELSEU=8*INT(.125*L):RETURN
428 POKE&HFFD8,0:IFEOF(1)=-1THEN
CLOSE#1:POKE&HFFD9,0:SCI=0:HPUT(
L,T)-(L+1,T+D),1:U=UT:GOTO50ELSE
GOSUB214:LINEINPUT#1,SK$:POKE&HF
FD9,0
430 IFSK=0THENSCI=0:U=UT:GOTO450
432 POKE&H23,A1:POKE&H24,A2:IFKS
<=LEN(SK$)THENK$=MID$(SK$,KS,1)E
LSE446
434 IFASC(K$)=91THENK$=CHR$(13):
RS=1
436 IFASC(K$)=94THENKS=KS+2:IFKS
>LEN(SK$)THENKS=1:GOTO428ELSE432
438 IFL=U AND K$=" "THENSZ=1ELSE
IFL=U+S AND K$<>" " AND SZ=1THEN
HPUT(L,T)-(L+1,T+D),1:L=U:SZ=0EL
SESZ=0:IFL>U AND KS=1 AND K$=" "
THENHPUT(L,T)-(L+1,T+D),1:L=U:IF
T<P AND T<191-2*D THENT=T+1+D EL
SESK=0:GOTO430
440 KS=KS+1:GOTO62
442 IFH=1THENU=4*INT(.25*L):RETU
RNELSEU=8*INT(.125*L):RETURN
444 IFSCI<>2THEN124ELSESK=0:GOTO
430
446 IFSK$=""THENHPUT(L,T)-(L+1,T
+D),1:L=U ELSEKS=1:IFRS=1THENRS=
0:GOTO428ELSEIFL+S+8>W THEN488EL
SEK$=" ":GOTO62
448 IFT<P AND T<191-2*D THENT=T+
1+D:GOTO62ELSESK=0:GOTO430
450 T=V:HSCREEN0:CLS:ATTR0,4
452 LOCATE4,8:PRINT"Do you want
to save on disk the          rest
 of the ASCII strings of":LOCATE
13,10::PRINTFA$;":";ZA$:LOCATE4,
11:PRINT"for later translation t
o their          font images? (Y
/N)  ";
454 K$=INKEY$:IFK$=""THEN454
456 IFK$="N" OR K$="n"THENCLOSE#
1:GOTO168
458 IFK$="Y" OR K$="y"THENLOCATE
4,14:PRINT"The rest of the strin
gs will be          saved in REST
:";ZA$;
460 IFFA$="REST"THENRE$="TEMP"EL
SERE$="REST
462 POKE&HFFD8,0:OPEN"O",#2,RE$+
":"+ZA$
464 GOSUB476:IFKS>=LEN(SK$)THEN4
68
466 PRINT#2,RIGHT$(SK$,LEN(SK$)-
KS)
468 IFEOF(1)=-1THENCLOSE#1:CLOSE
#2:GOTO472
470 GOSUB214:LINEINPUT#1,SK$:PRI
NT#2,SK$:GOTO468
472 IFRE$="TEMP"THENKILL"REST/DA
T:"+ZA$:RENAME"TEMP/DAT:"+ZA$ TO
"REST/DAT:"+ZA$
474 GOTO168
476 KS=KS-1:IFKS=0THENRETURNELSE
IFMID$(SK$,KS,1)<>" "THEN476ELSE
RETURN
478 GOSUB212:SK=6:KS=1:SCI=2:CLS
:LOCATE4,8:PRINT"Type filename o
f ASCII file you          want tr
anslated:  ";:LINEINPUTFA$:Z$=RI
GHT$(FA$,2):ZA$="0":IFASC(Z$)=58
THENZA$=RIGHT$(Z$,1):FA$=LEFT$(F
A$,LEN(FA$)-2)
480 POKE&HFFD8,0:OPEN"I",#1,FA$+
":"+ZA$:RETURN
482 GOSUB212:CLS:LOCATE11,9:PRIN
T"1: FULL SCREEN FILE":LOCATE11,
10:PRINT"2: HALF SCREEN FILE":LO
CATE11,11:PRINT"3: WORD PROCESSO
R FILE":LOCATE11,12:PRINT"4: ASC
II STRINGS
484 GOSUB322:IFK$="1"THENI1=1:GO
SUB30:I1=0:GOTO128ELSEIFK$="2"TH
ENI1=1:GOSUB34:I1=0:GOTO128ELSEI
FK$="3"THEN486ELSEIFK$="4"THENSC
I=1:UT=U:GOSUB426:GOSUB412:GOTO1
68ELSESOUND60,5:GOTO128
486 UT=U:GOSUB478:GOTO168
488 HPUT(L,T)-(L+1,T+D),1:L=U:IF
T<P AND T<191-2*D THENT=T+D+1:GO
TO428ELSESK$="":GOTO448
490 CLOSE#1:FORI=0TO2000:NEXT:GO
TO128
492 IFERLIN=472THEN474
494 IFERLIN=40THEN48
496 IFERLIN=328THENSOUND60,9:GOS
UB328:GOTO128
498 IFERLIN=98THENT1=T:FORI=1TOS
F:HPUT(U,T)-(W-1,T+INT(D/SF)),4:
T=T+INT(D/SF):NEXT:T=T1:L=U:GOTO
50
500 IFERLIN=470 AND ERNO=23 THEN
CLOSE#1:CLOSE#2:GOTO472
502 IFERLIN=30 OR ERLIN=34 OR ER
LIN=480THEN504ELSE506
504 SCI=0:SOUND60,5:LOCATE5,11:P
RINT"THERE IS NO FILE BY THAT NA
ME":LOCATE7,13:PRINT"ON THE DISK
 IN DRIVE ";:IFZ$=""THENPRINT"0"
:GOTO490ELSEIFASC(Z$)=58THENPRIN
TRIGHT$(Z$,1):GOTO490ELSEPRINT"0
":GOTO490
506 IFERLIN=26THENKILLF$+"/HR1":
KILLF$+"/HR2":RENAME"OUT1/BIN"TO
F$+"/HR1":RENAME"OUT2/BIN"TOF$+"
/HR2":DRIVE0:GOTO128
508 IFERLIN=28THENKILLF$+"/HR":R
ENAME"OUT/BIN"TOF$+"/HR":DRIVE0:
GOTO128
510 IFERLIN=12THENWIDTH32:CLS:PR
INT"";:WIDTH40:CLS3:LOCATE1,8:PR
INT"INSERT ULE DISK IN DRIVE 0 &
 HIT SPACE";:GOSUB322:POKE&H13FF
,9:GOSUB12:GOTO128
512 IFERLIN=180THENCLOSE#1:K$="F
":SOUND60,9:EXEC&HF8E:GOTO138
514 GOTO334
516 IFH=1THENU=.5*U:W=.5*W:RETUR
NELSERETURN
```

Submitting Material To Rainbow

Contributions to THE RAINBOW are welcome from everyone. We like to run a variety of programs that are useful, helpful and fun for other CoCo owners.

WHAT TO WRITE: We are interested in what you want to tell our readers. We accept for consideration anything that is well-written and has a practical application for the Tandy Color Computer. If it interests you, it will probably interest lots of others. However, we vastly prefer articles with accompanying programs that can be entered and run. The more unique the idea, the more the appeal. We have a continuing need for short articles with short listings. These are especially appealing to our many beginners.

FORMAT: Program submissions must be on tape or disk, and it is best to make several saves, at least one of them in ASCII format. We're sorry, but we do not have time to key in programs and debug our typing errors. All programs should be supported by some editorial commentary explaining how the program works. We also prefer that editorial copy be included in ASCII format on the tape or disk, using any of the word processors currently available for the Color Computer. Also, please include a double-spaced printout of your editorial material and program listing. Do not send text in all capital letters; use upper- and lowercase.

COMPENSATION: We do pay for submissions, based on a number of criteria. Those wishing remuneration should *so state* when making submissions.

For the benefit of those wanting more detailed information on making submissions, please send a self-addressed, stamped envelope (SASE) to: Submission Guidelines, THE RAINBOW, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. We will send you comprehensive guidelines.

Please do not submit material currently submitted to another publication.

Intercom

An important link in the CoCo community is its ability to communicate with fellow users. If questions arise, a fresh source of information can be invaluable. We here at THE RAINBOW have decided to create "Intercom," an information exchange point for Pen Pals, CoCo Clubs and BBSs.

If you would like a Pen Pal or are running a CoCo Club or BBS, send us a letter including the information listed here to: The Rainbow Intercom, P.O. Box 385, Prospect, KY 40059.

Only those parties who have signed our non-piracy "agreement form" appear in listings of Intercom. Also, please notify us if you want to add or delete any names on this list.

PEN PALS

✍ I'm 18 years old, and my system includes a 64K CoCo 2, a CCR-81, Orchestra 90-CC, a Speech/Sound Cartridge, a modem and a B/W TV set. I enjoy designing practical cassette-based applications for the CoCo. I also enjoy writing and performing music in English and French. I am somewhat fluent in written French. I will try to answer all legitimate letters.

Steve W. Buehler
1102 West Sierra Avenue
Santa Ana, CA 92707-3856

✍ I'm a 15-year-old student and own a 512K CoCo 3, two disk drives, a CM-8 monitor, a DMP-105 printer and a 2400-bps modem. I co-SysOp a BBS and love reading THE RAINBOW. I don't know much OS-9 or machine language, but I'm learning. I like telecommunications, word processing and games. If you can speak English well, I would be happy to talk to you.

Norman Gibson
450 Wilfrid Lavigne #202
Aylmer, PQ J9H 3W2
Canada

✍ I want to start a club here in Madison. I'll call mine the Eastside CoCo Madison Club. I have a CoCo 3 with a tape recorder and an RGB monitor. I also have a CoCo 2. If someone can provide instruction on how to use my modem I would be grateful. I'm looking for catalogs of information, ideas and contacts.

Matt Thornton
102 Village Gr. Ln. E.
Madison, WI 53704

✍ I'm 17 years old and am looking for a pen pal. I enjoy using my 512K CoCo 3 with printer, disk drive, Slot pack, modem and Delta Pro Pack for many programming purposes, including school work, games and music. I would enjoy corresponding with anyone who shares my interest in computers. My other hobbies include science fiction and music. I'll answer all letters I receive.

Jason Leinen
916 Beverly Lane
West Bend, WI 53095

CoCo CLUBS

ARIZONA

☎ Tucson Color Computer Club, Bruce Smith, 3030 Mustang Drive, Tucson, 85708, (602) 747-7859

CALIFORNIA

☎ Color America Users Group, Jack W. Eizenga, 3811 N. Foster Ave., Baldwin Park, 91706-3912, (818) 960-8010

COLORADO

☎ Colorado Springs Color Computer Club, Bud Ward, 1118 Claiborne Road, Colorado Springs, 80906-5513, (719) 392-8268

CONNECTICUT

☎ Connecticut CoConut Connection, Charles Joseph Scanlon, 1 Hoskins Rd., Apt. 8A6, Simsbury, 06070, (203) 651-8134

FLORIDA

☎ Cross-Country Color Computer Club, Tom Tittle, 860 Gardenia Drive, Royal Palm Beach, 33411, (407) 798-3726

GEORGIA

☎ Atlanta Computer Society, Inc., Alan R. Dages, 4290 Bells Ferry Road, Suite 10639, Kennesaw, 30144, (404) 469-5111 voice, (404) 636-2991 modem

IDAHO

☎ Snake River Color Computer Club, Emil Franklin, 1750 Carmel Drive, Idaho Falls, 83403, (208) 522-0220

ILLINOIS

☎ Glenside Color Computer Club, Tony Podraza, 119 Adobe Circle, Carpentersville, 60110, (708) 428-3576

IOWA

☎ Mid Iowa CoCo, Terry Simons, 1328 48th, Des Moines, 50311, (515) 279-2576

KANSAS

☎ The Kansas City Color Computer Users Group, Gay Crawford, 1601 Kiowa Drive, Olathe, 66062, (913) 764-9413

KENTUCKY

☎ Hardin County Color Computer Club, Paul Urbahns, 2887 Republic Ave., Radcliff, 40160, (502) 351-4757

LOUISIANA

☎ The CoCo SIG, Christopher Mayeux, 20 Gibbs Drive, Chalmette, 70043, (504) 277-6880 voice, (504) 277-5135 modem

MASSACHUSETTS

☎ NorthEast CoCo Club, Jose Joubert, 440 North Ave., Bldg. 9 #210, Haverhill, 01830, (508) 521-0164

MICHIGAN

☎ Greater Lansing Color Computer Users Group, E. Dale Knepper, P.O. Box 14114, Lansing, 48901, (517) 626-6917

MISSISSIPPI

☎ Central Mississippi Color Computer Society, Boisy G. Pitre, 6011 I-55 North, Jackson, 39213, (601) 956-9377

MISSOURI

☎ CoCoNuts User Group, Clyde Lloyd, 2116 N. Columbia, Springfield, 65803, (417) 866-8738

NEBRASKA

☎ Bruce Gerst c/o Metro Area CoCo Club, P.O. Box 3422, Omaha, 68103

NEW YORK

☎ Adirondack Color Computer Club, Thomas P. Delaney, 10 Rosewood Drive, Clifton Park, 12065, (518) 371-4781

NORTH CAROLINA

☎ Norca Users Group, Matthew Royal, Route 21 Box 906, Fayetteville, 28304, (919) 484-1230

OHIO

☎ The Columbus and Central Ohio Color Computer Club, Richard Heber, 546 Woodside Drive S.W., Pataskala, 43062, (614) 927-3357

PENNSYLVANIA

☎ Pittsburgh Color Group, Ralph Marting, 309 Frazier Drive, Pittsburgh, 15235, (412) 823-7607

RHODE ISLAND

☎ New England "CoCoNuts" Color Computer Club, Arthur J. Mendonca, P.O. Box 28106 North Station, Providence, 02908, (401) 272-5096 (Sig3)

SOUTH CAROLINA

☎ Spartanburg CoCo Club, Jesse W. Parris, 152 Bon Air Ave., Spartanburg, 29303, (803) 573-9881

SOUTH DAKOTA

☎ Empire Area Color Computer Users Group of South Dakota, Carl Holt, P.O. Box 395, Brandon, 57005, (605) 582-3862

TEXAS

☎ Mid Cities TRS-80 Users Group, Rob Yoder, P.O. Box 171566, Arlington, 76003, (817) 535-7931

UTAH

☎ Salt City CoCo Club, L. Todd Knudsen, 6357 S. Lotus Way, West Jordan, 84084, (801) 968-8668

VIRGINIA

☎ Richmond Area Color Computer Organization, William T. Mays, Jr., 6003 Westbourne Drive, Richmond, 23230, (804) 282-7778

☎ Southwestern Virginia Color Computer Club, Ricky Sutphin, Route 1 Box 20, Henry, 24102, (703) 365-2018

WASHINGTON

☎ Bellingham OS-9 Users Group, Rodger Alexander, 3404 Illinois Lane, Bellingham, 98226, (206) 734-5806

☎ Port O' CoCo, Donald Zimmerman, 3046 Banner Rd. SE, Port Orchard, 98366-8810, (206) 871-6535

WEST VIRGINIA

☎ Huntington Area Color Computer Symposium, Jim Bush, P.O. Box 391, Lesage, 25537-0391, (304) 736-5314

AUSTRALIA

☎ Australian National OS-9 Users Group, Gordon Bentzen, C/- 8 Odin Street, Sunnybank, Queensland, 4109, (07) 344-3881

☎ Brisbane Southwest Colour Computer Users Group, Bob Devries, 21 Virgo St., Inala, Queensland, 4077, (07) 372-7816

CANADA

☎ 4 C's (Cornwall Color Computer Club), Robert L. LeBrun, 451 Leitch Dr., Cornwall, Ontario, K6H 5P5, (613) 932-4792 voice, (613) 936-0823 modem

☎ Le Club D'Oridinateur Couleur du Quebec Inc., 8000 Boul. Metropolitain, Ville d'Anjou, Quebec, H1K 1A1, (514) 729-8467

☎ The Edmonton CoCo Users Group, Lloyd Folden, 13208-128 Avenue, Edmonton, Alberta, T5L 3H2, (403) 426-1888

☎ Moncton-Dieppe-Riverview CoCo Club, Philippe Lantin, 77 Ninth St., Moncton, New Brunswick, E1E 3E5, (506) 382-7706

☎ Vancouver Color Computer Club (VC3), Jordan J. Dobrikin, P.O. Box 76734, Postal Station 5, British Columbia, V5R 557, (604) 420-6081

GERMANY

☎ OS-9 Users Group in Europe, Burghard Kinzel, Leipziger Ring 22A, 5042 ERFTSTADT, +49-2235-41069, (OS-9/6809)

THE NETHERLANDS

☎ European OS-9 User Group, Peter Tutelaers, Strijperstraat 50A, 5595 GD Leende, s88405777@hsepml.hse.nl, +31-4906-1971, (OSK)

PUERTO RICO

☎ Puerto Rico Color Computer Club, Luis R. Martinez, P.O. Box 2072, Guaynabo, 00657-7004, (809) 799-8217 or (809) 728-2314

State/City	BBS Name	Access Number	Parameters (Speed-Parity-Word Bits-Stop Bits)	SysOp
Arkansas				
Jonesboro	The 8-Bit Wonderland	(501) 931-9528	300/1200/2400-N-8-1	Mike Smith
Sheridan	The Grant County BBS	(501) 942-4047	300/1200/2400-N-8-1	Eddie Gilmore
California				
Hollywood	Zog's Cavern BBS	(213) 461-7948	300/1200/2400-N-8-1	Alan Sheltra
Laguna Hills	Rainbow Connection Info Service	(714) 831-6530	300/1200/2400-N-8-1	Eric Levinson
Marysville	09-Online BBS	(916) 742-6809	300/1200-N-8-1	Jim Vestal
Colorado				
Colorado Springs	The Time Safari	(719) 635-7228	300/1200-N-8-1	David Vallier
Connecticut				
Manchester	Silk City BBS	(203) 649-9057	300/1200/2400-N-8-1	Darren Kindberg
Waterbury	Applause BBS	(203) 754-9598	300/1200/2400-N-8-1	Carmen Izzi, Jr.
Florida				
Cocoa Beach	KB Enterprises' CEBBS[1]	(407) 799-3282	300/1200-N-8-1	Kevin Berner
Hawaii				
Ft. Shafter	CoCo'Nuts BBS Service	(808) 845-7054	300/1200/2400-N-8-1	Tommie Taylor
Illinois				
Carpentersville	The Pinball Haven BBS	(708) 428-8445	300/1200/2400-N-8-1	Jeffrey R. Chapin
La Grange Park	S & V BBS	(708) 352-0948	300/1200/2400-N-8-1	Paul Jerkatis
Kansas				
Beloit	Kansas Konnektion BBS	(913) 738-5613	300/1200-N-8-1	Gary N. McCarty
Louisiana				
Harvey	The Node 3	(504) 347-4320	300/2400-N-8-1	Gene Clifton
Michigan				
Lansing	Benchboard BBS	(517) 394-2447	300/1200/2400-N-8-1	John Evans
Taylor	J & L's CoCo Corner	(313) 292-4713	300/1200/2400-N-8-1	Jim Snider
New York				
Wappingers Falls	The Dutchess CoCo	(914) 838-1261	300/1200/2400-N-8-1	Chris Serino
North Carolina				
Concord	The Stargate BBS	(704) 788-7867	300/1200/2400-N-8-1	Jim Brock
Wilmington	Bill's Board	(919) 395-4366	300/1200/2400-N-8-1	Bill Medcalf
North Dakota				
Minot AFB	The 9-Line BBS	(701) 727-6826	300/1200-N-8-1	David Hensley
Ohio				
Columbus	Springwood BBS	(614) 228-7371	300/1200/2400-N-8-1	Edward Langenback
Reynoldsburg	East Side Connection CEBBS	(614) 755-2492	300/1200/2400-N-8-1	John L. Wilkerson
Oklahoma				
Tecumseh	Pat BBS[2]	(405) 598-5082	300-N-8-1	Pat Aldridge
Pennsylvania				
Conshohocken	Charlie's Help Line	(215) 825-3226	300/1200-N-8-1 or N-7-1	Charles DiMartino
Johnstown	CoCo Electronic BBS[3]	(814) 535-1497	300/1200/2400-N-8-1	Albert Baldish
Rhode Island				
Central Falls	The Weather Connection II BBS	(401) 728-8709	300/1200/2400-N-8-1	Eric Chew
Virginia				
Fall Mills	Clem's Corner BBS[4]	(703) 322-4053	300/1200-N-8-1	Richard Douglas Bailey
Richmond	Tree House BBS	(804) 744-0157	300/1200/2400-N-8-1	Doug James
Wisconsin				
Marinette	Phoenix Interstate Data Systems[5]	(715) 732-1036	300/1200/2400/9600-N-8-1	Joe Boburka
Canada				
Lunenburg, N.S.	Color Nova BBS	(902) 634-3095	300/1200/2400-N-8-1	John D. Cleveland
Cornwall, Ontario	4C's BBS	(613) 936-0823	300/1200/2400-N-8-1	Mike Lebrun

Notes: [1]KB Enterprises' CEBBS is up from 5 p.m. to 9 a.m. (EST) seven days a week.
[2]Pat BBS is up 5 p.m. to 9 p.m. weekdays and 10 a.m. to 10 p.m. weekends. This new BBS is counting on you for uploads.
[3]CoCo Electronic BBS is up 8 p.m. to 6 a.m. seven days a week.
[4]Clem's Corner BBS is up from 6 p.m. to 11 p.m. seven days a week.
[5]Phoenix Interstate Data Systems has a .75/hr charge for premium services, paid in advance.

PCM®

The *Premier* **P**ersonal **C**omputer **M**agazine for Tandy® Computer Users

Not only does Tandy produce our favorite CoCo, we think it produces the best portable and MS-DOS computers as well. We've found that when satisfied Color Computer users decide to add portability or MS-DOS to their computing habits, many stick with Tandy. For these people we publish PCM, The *Premier* Personal Computer Magazine for Tandy Computer Users.

Each month in PCM, you'll find information and programs for the Tandy 100, 102 and 200 portable computers. And you'll find even more coverage for Tandy's MS-DOS machines — from the graphics of the 1000 to the power of the 5000.

PROGRAMS AND PROGRAM DISKS!

We learned from THE RAINBOW that readers want programs to type in, so each month we bring you an assortment of them: games, utilities, graphics, and home and business applications. For those who don't have time to type in listings, we offer a companion disk with all the programs from the magazine. Also included in PCM each month is the *Software Shopper*, an "onmail" database service from which you can order the latest shareware products from our Delphi databases for Tandy MS-DOS and PC users — even if you don't have a modem!

TUTORIALS AND PRODUCT REVIEWS!

As if all this weren't enough, we offer regular tutorials on *DeskMate*, telecommunications and hardware; assembly language, BASIC and PASCAL programming tips; and in-depth reviews of the new software, peripherals and services as they are released. Add it all up and we think you'll find PCM to be the most informative and fun magazine for this market today!

YES! Please send me a one year (12 issues) subscription to PCM for only $28.* A savings of 22% off the newsstand price.

Name _____

Address _____

City _____

State _____

ZIP _____

In order to hold down costs, we do not bill.

My check in the amount of _____ is enclosed.

Charge to my:

❑ VISA ❑ MasterCard ❑ American Express

Acct. # _____

Exp. Date ____ Signature _____

To order by phone (credit card orders only) call 800-847-0309, 9 a.m. to 5 p.m. EST. For other inquiries call 502-228-4492.

* Canadian subscribers U.S. $38 plus 7% GST. Surface rate elsewhere $64, airmail $85. Allow 6 to 8 weeks for first copy. Kentucky residents add 6% sales tax. U.S. currency *only*, please.

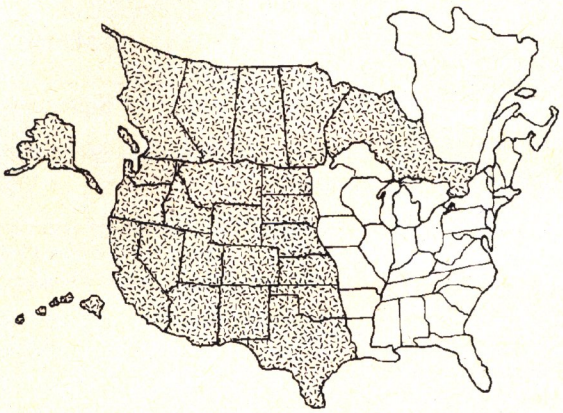
Mail to: PCM, The Falsoft Building, P.O. Box 385, Prospect, KY 40059

Advertisers Index

We encourage you to patronize our advertisers — all of whom support the Tandy Color Computer. We will appreciate your mentioning* THE RAINBOW *when you contact these firms.

Ace	47	Delphi	59	PCM Magazine	64
Burke & Burke	35	Delphi	BC	Rainbow Back Issues	32
Burke & Burke	45	Eversoft Games, Ltd	33	Rainbow Binders	66
CoCoPRO!	14	Frank Hogg	21	Rainbow on Tape and Disk	51
CoCoPRO!	15	Granite Computer Systems	43	SpectroSystems	43
Colorware	11	Hawksoft	17	Sundog Systems	37
Computer Plus	IFC	JWT Enterprises	37	Sundog Systems	IBC
Dayton Associates of W.R. Hall, Inc.	54	Microcom	5	T & D Software	9
		MV Systems	33	T & D Software	39
Dayton Associates of W.R. Hall, Inc.	55	Owl-Ware	25	Trading Post	29
		Owl-Ware	26	Zebra Systems	17
Delmar Company	19	Owl-Ware	27		

Call:
Belinda Kirby
Advertising Representative
(502) 228-4492



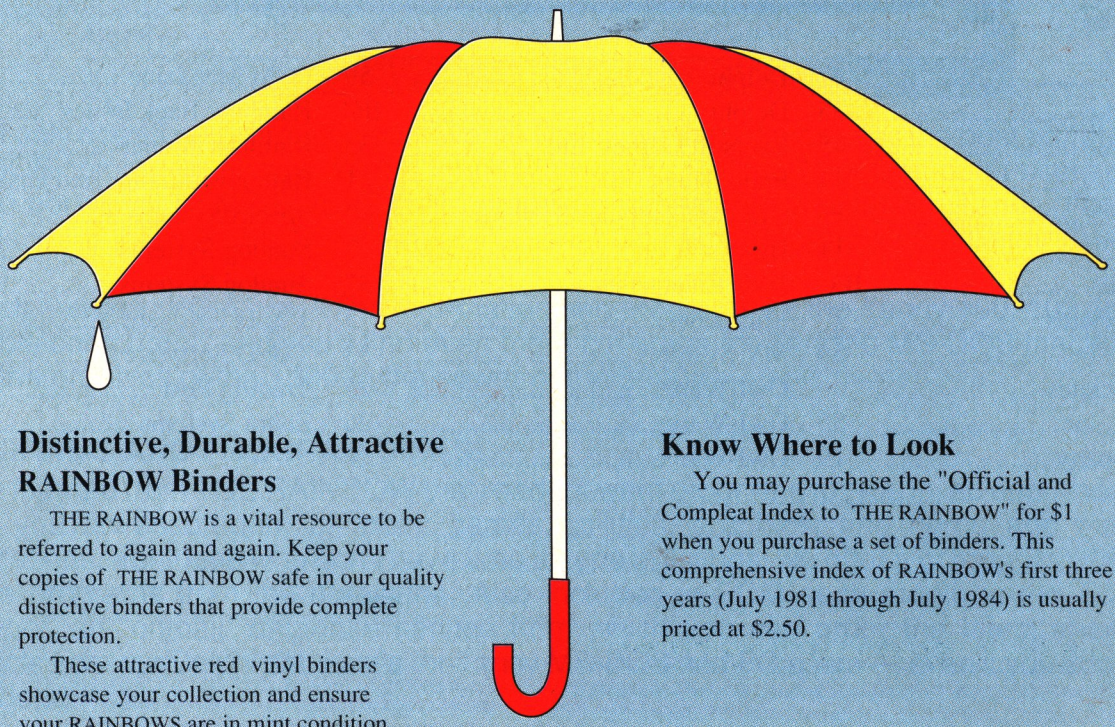
Call:
Kim Lewis
Advertising Representative
(502) 228-4492

The Falsoft Building
9509 U.S. Highway 42, P.O. Box 385, Prospect, KY 40059

FAX (502) 228-5121

Protect

your important magazine collection



Distinctive, Durable, Attractive RAINBOW Binders

THE RAINBOW is a vital resource to be referred to again and again. Keep your copies of THE RAINBOW safe in our quality distictive binders that provide complete protection.

These attractive red vinyl binders showcase your collection and ensure your RAINBOWS are in mint condition for future use. Each binder is richly embossed with the magazine's name in gold on the front and spine. They make a handsome addition to any room.

Put and End to Clutter

Organize your workspace with these tasteful binders. Spend more time with your CoCo and eliminate those frustrating searches for misplaced magazines.

A set of two binders, which holds a full 12 issues of THE RAINBOW, is only $13.50 (plus $2.50 shipping and handling).

Special Discounts on Past Issues

To help you complete your collection of THE RAINBOW, we're offering a special discount on past issues of the magazine.

When you place and order for six or more back issues of THE RAINBOW at the same time you order binders, you are entitled to $1 off the regular back issue price. To order, please see the "Back Issue Information" ad in this issue.

Know Where to Look

You may purchase the "Official and Compleat Index to THE RAINBOW" for $1 when you purchase a set of binders. This comprehensive index of RAINBOW's first three years (July 1981 through July 1984) is usually priced at $2.50.

Yes! Please send me _____ set(s) of Rainbow binders

Name _____

Address _____

City _____

State _____ Zip _____

❑ My check in the amount of _____ is enclosed.

charge to: ❑ VISA ❑ MasterCard ❑American Express

Account Number _____

Expiration Date ____ Signature _____

I want to take advantage of these special offers with my binder purchase:

❑Save $1 off the single issue cover price for back issues. Minimum order of 6 magazines .Please enclose a back issue order form from a recent issue indicating magazines wanted.

❑Purchase the Official and Compleat Index to THE RAINBOW" for $1. (Regular price $2.50.)

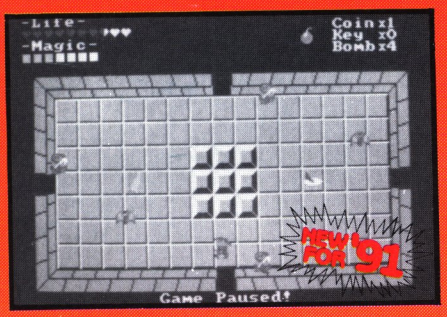
Special offers good only with the purchase of a RAINBOW binder set. Binders are $13.50 per two-binder set plus $2.50 shipping and handling, If your order is to be sent via U.S. mail to a post office box or foreign country, please add $2. Kentucky residents add 6% sales tax; Canadian reidents, 7%GST. U.S. currency only please. In order to hold down non-editorial costs, we do not bill.

Mail to: Rainbow Binders, The Falsoft Building, P.O. Box 385, Prospect KY 40059. For credit card orders call(800) 847-0309, 9a.m. to 5 p.m. EST. All other inquiries call (502) 228-4492

NEW FOR '91

SUNDOG SYSTEMS

The Quest for THELDA

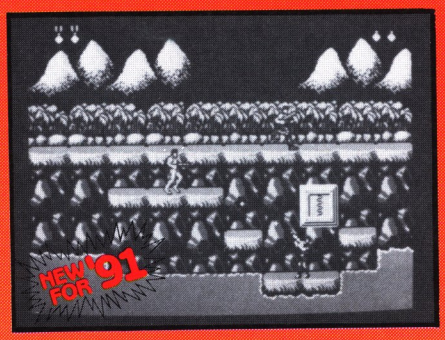


Better men than you have failed the quest, but the hand of the good princess Thelda is too much to resist! Stolen by the evil necromancer Divinax, she has been secreted far from prying eyes and it is now up to you to regain the pieces of the mystical Life Force and save the fair lady. The Quest for Thelda is an outstanding arcade program that combines action and adventure to bring you an incredible video game playing experience. Travel throughout over 500 different screens searching for magical objects and spells, fighting horrible creatures, and gathering the various parts of the Life Force guarded by ever-increasing terrors. You'll enjoy the highest quality 320x200 resolution 16 color graphics and digital sound effects that you've come to expect from Sundog Systems. The game play is fast and furious, and only you can rescue the princess and complete the **LEGEND OF THELDA!** Req. 128K CoCo 3, disk drive, and joystick (2-button joystick supported).

$34.95

Hint book now available for Thelda! Contains clues, maps, and even a BASIC program to modify your own characters! **$4.95**

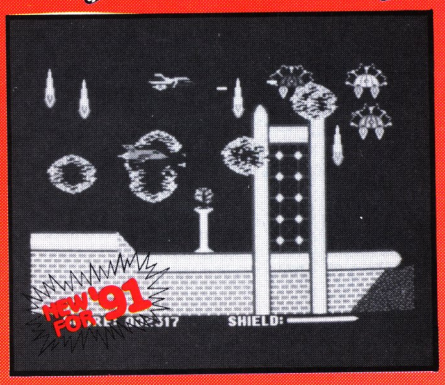
THE CONTRAS



In the year 2671, a mysterious object landed on Earth, heralding the alien invasion of the Red Falcon. Only two courageous soldiers have a hope of stemming this alien infestation. Armed with your military training and the latest weapon technology, you and a friend must fight back the horde. Sundog Systems presents our second 512K game, **The Contras**. You'll see why we decided to use 512K on this project! Amazing graphics with 320x225 resolution, 16 color full screen animation and horizontal smooth scrolling! Background digital sound effects and real-time music! One or two player action AT THE SAME TIME! You'll agree that this is one of the best arcade games yet for your 512K CoCo 3. Needless to say, playing hero won't be easy; playing The Contras will be tougher! Req. 512K CoCo 3, disk drive, and 2-button joystick.

$34.95

Crystal City



The superior technology of the evil Overlords has ensnared yet another innocent planet; however, this one contains the Crystal City, bastion of democracy and independence. Earth has had enough! Break through level upon level of their virtually invulnerable defenses, defeat the end guardians, and make your way ever closer to freeing the slaves of the Crystal City! This amazing arcade game is an achievement in its own right. Full 128K/512K utilization! Super fast horizontal hardware scrolling on the 128K computer! Wild digital sound effects and background music score! 30 minutes, or over 30 megabytes, of non-repeating 320x200 resolution, 16 color graphics! This game has it all; order a demo disk to see it first! Can you save the Crystal City from unbeatable foes? Req. 128K CoCo 3, disk drive, and joystick.

$34.95

Sinistaar

You've raved about this 512K arcade game! The graphics and animation are amazing! You've got to hear the digital sounds! 512K (three disks) packed with excitement. 512K CoCo 3 only. $34.95

KYUM-SAI To Be NINJA

This martial arts arcade game remains a CoCo 3 phenomenon. One of our best sellers to date! Play the incredible combat experience that you've been missing, and call for the availability of the OS-9 version. 128K CoCo 3 action. $29.95.

OS-9 Version Now Available

SOUNDTRAX

This 128K/512K sound sequencing system has become an immensely popular program. Create musical scores using polyphonic digitized sounds and a user-friendly point and click editor. Call to order the SoundTrax demo program, and get 10% off your purchase with receipt. $34.95

Now Available: SoundTrax instrument sample disks! Guitars, strings, woodwinds, and just plain weird instruments for your composing pleasure. Completely compatible with the SoundTrax system. 3 flippy (2 sides) disks full of sounds. $12.95 each or $29.95 for all three.

Zenix

You have been chosen to pilot the spacecraft wielding the plutonium plasma laser against the nefarious insectoids, the Zenians. These bugs have been ripping off the space trade lines for years; now they're about to find a victim who can fight back! Beat back the swarm of pests to their home planet Zenix, and use the laser to end the menace once and for all. Zenix is a lightning fast arcade game for the 128K CoCo 3. The 320x225 16 color graphics are amazing, as are the digital background music score and effects, all on a 128K computer! The fast action and game play will astound you in this GALAGA of extermination. Plug in your joystick and strap in for the ride of your life! Call to order a demo disk to see the action before you buy! Req. 128K CoCo 3, disk drive, and joystick.

$29.95

Visa, Mastercard, Check, Money Order, and COD (USA only, please) accepted. All foreign orders must be sent in US currency Money Orders. Include $2.50 for shipping in USA and Canada. $5.00 Foreign. $3.00 extra for COD orders. PA residents add 6% sales tax. Dealer inquiries welcome. Authors: we're looking for new software!

ALSO AVAILABLE:

Hall of the King 1, 2, or 3 CoCo 1 - 3	$29.95 ea.
Hall of the King Trilogy	$74.95
White Fire of Eternity CoCo 1 - 3	$19.95
Dragon Blade CoCo 1 - 3	$19.95
Champion CoCo 1 - 3	$19.95
Paladin's Legacy CoCo 1 - 3	$24.95
Warrior King CoCo 3	$29.95
In Quest of the Star Lord CoCo 3	$34.95
Hint Sheet	$ 3.95
Kung-Fu Dude CoCo 1 - 3	$24.95

VISA MasterCard

Sundog systems

We've Moved!

P.O. Box 766
Manassas, VA 22111
703 / 330-8989

Being online never felt so fine.

Join the online network with personality. The most interesting conferences. 10,000 programs you can download for your own use. All the most popular services.

Two membership plans: $6 an hour or $1 an hour with the 20/20 Advantage.

Join us online, the water's fine.

Free Membership

Dial by modem,

1-800-365-4636

Press return. At password, type RB22

DELPHI

Voice, 1-800-695-4005
617-491-3393